

**Navy Advancement Center**

Web site: <http://www.advancement.cnet.navy.mil>

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# **Advancement Handbook for Electrician's Mate**

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## **PREFACE**

The purpose of the Advancement Handbook is to help you focus your preparation for Navywide advancement-in-rating examinations. The bibliographies (BIBs) together with this handbook form a comprehensive examination study package. Since this handbook provides skill and knowledge components for each paygrade of the Electrician's Mate rating, it helps you concentrate your study on those areas that may be tested. This feature will help you get the most out of your study time.

Each page in Parts 1 through 4 of this Advancement Handbook presents general skill areas, specific skill areas, the knowledge factors associated with each skill area, the pertinent references that address each skill, and the subject areas that may be covered on the examination. The skill statements describe the skills you are expected to perform for each paygrade. The skill statements are cumulative; that is, you are responsible for the skills for the paygrade you are competing for, your present paygrade, and all paygrades below.

Although this handbook is very comprehensive, it cannot cover all the tasks performed in the rating. As a result, the advancement examinations may contain questions more detailed than described in the "*Exam Expectations*" section of the skill areas.

Remember that advancement competition is keen, so your keys to advancement include not only comprehensive advancement examination study but also sustained superior performance.

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Development and Technology Center

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## Part 1

### Advancement Handbook for EM3

## Advancement Handbook for EM3

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| General EM <i>Skill Area</i>   | <b>Electrical Installations</b>   |
| A <i>skill</i> you are expected to perform from the General Skill Area above:            | <b>Performing maintenance on power casualty cables</b>  |
| <i>Knowledge</i> you should have to perform this skill:                                  | <p>Identify the procedures to follow when performing the following actions on components of power casualty cables:</p> <ul style="list-style-type: none"> <li>• Cleaning</li> <li>• Inspecting</li> <li>• Testing</li> <li>• Troubleshooting</li> <li>• Repairing</li> </ul> <p>Recall applicable</p> <ul style="list-style-type: none"> <li>• Theory</li> <li>• Safety precautions</li> </ul>  |
| <i>References</i> you should study to gain the knowledge you need to perform this skill: | <ul style="list-style-type: none"> <li>• Ship's Maintenance Material Management (3-M) Manual, OPNAVINST 4790.4</li> <li>• Navy Occupational Safety and Health (NAVOSH) Program Manual, OPNAVINST 5100.19</li> <li>• Navy Ship's Technical Manual (NSTM), Chapter 79, Volume 3, Damage Control–Engineering Casualty Control, NAVSEA S9086-CN-STM-030</li> <li>• NSTM, Chapter 300, Electrical Plant General, NAVSEA S9086-KC-STM-010</li> <li>• NSTM, Chapter 491, Electrical Measuring and Test Equipment, NAVSEA S9086-Q5-STM-000</li> <li>• Navy Electricity and Electronics Training Series (NEETS), Modules 1, 2, 3, 4, 16, 19, 20, and 21</li> <li>• Engineering Operations Sequencing System (EOSS) User's Guide</li> </ul> |

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| <p><i>Exam Expectations.</i> These are subject areas you should know to help you answer exam questions correctly:</p> | <p>You can expect questions on the procedures for cleaning, inspecting, testing, troubleshooting, and repairing power casualty cables. You can also expect questions dealing with applicable theory and safety precautions.</p> |
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| General EM <i>Skill Area</i>   | <b>Electrical Installations</b>  |
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| <i>A skill you are expected to perform from the General Skill Area above:</i>                                  | <b>Rig and unrig shore power cables</b>  |
| <i>Knowledge you should have to perform this skill:</i>  | <p>Identify the procedures to use when performing the following corrective and planned maintenance on shore power cables:</p> <ul style="list-style-type: none"> <li>• Fabricating</li> <li>• Cleaning</li> <li>• Inspecting</li> <li>• Testing</li> <li>• Rigging</li> <li>• Unrigging</li> </ul> <p>Recall applicable</p> <ul style="list-style-type: none"> <li>• Theory</li> <li>• Safety precautions</li> </ul>   |
| <i>References you should study to gain the knowledge you need to perform this skill:</i>                       | <ul style="list-style-type: none"> <li>• Ships' 3-M Manual, OPNAVINST 4790.4</li> <li>• NAVOSH Program Manual, OPNAVINST 5100.19</li> <li>• NSTM, Chapter 300, Electrical Plant General, NAVSEA S9086-KC-STM-010</li> <li>• NSTM, Chapter 491, Electrical Measuring and Test Equipment, NAVSEA S9086-Q5-STM-000</li> <li>• NEETS, Modules 1, 2, 3, 4, 16, 19, 20, and 21</li> <li>• Engineering Operational Sequencing System (EOSS) User's Guide</li> </ul> |
| <i>Exam Expectations.</i> These are subject areas you should know to help you answer exam questions correctly: | You can expect questions on the procedures to use when fabricating, cleaning, inspecting, testing, rigging, and unrigging shore power cables including applicable theory and safety precautions.   |

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| General EM <i>Skill Area</i>   | <b>Electrical Installations</b>   |
| A <i>skill</i> you are expected to perform from the General Skill Area above:                                  | <b>Perform planned maintenance on grounding straps</b>  |
| <i>Knowledge</i> you should have to perform this skill:  | <p>Recall the procedures to use when performing the following actions on grounding straps:</p> <ul style="list-style-type: none"> <li>• Cleaning</li> <li>• Inspecting</li> <li>• Testing</li> <li>• Repairing</li> <li>• Replacing</li> </ul> <p>Recall applicable</p> <ul style="list-style-type: none"> <li>• Theory</li> <li>• Safety precautions</li> </ul>                    |
| <i>References</i> you should study to gain the knowledge you need to perform this skill:                       | <ul style="list-style-type: none"> <li>• Ships' 3-M Manual, OPNAVINST 4790.4</li> <li>• NAVOSH Program Manual, OPNAVINST 5100.19</li> <li>• NSTM, Chapter 300, Electrical Plant General, NAVSEA S9086-KC-STM-010</li> <li>• NSTM, Chapter 491, Electrical Measuring and Test Equipment, NAVSEA S9086-Q5-STM-000</li> <li>• NEETS, Modules 1, 2, 3, 4, 16, 19, 20, and 21</li> </ul> |
| <i>Exam Expectations.</i> These are subject areas you should know to help you answer exam questions correctly: | You can expect questions on the procedures for cleaning, inspecting, testing, repairing, and replacing grounding straps including the applicable theory and safety precautions.   |



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| General EM <i>Skill Area</i>   | <b>Power Distribution</b>  |
| A <i>skill</i> you are expected to perform from the General Skill Area above:                                  | <b>Perform planned maintenance on automatic bus transfers (ABTs)</b>   |
| <i>Knowledge</i> you should have to perform this skill:  | <p>Recognize the procedures to follow when performing the following actions on components of ABTs:</p> <ul style="list-style-type: none"> <li>• Cleaning</li> <li>• Inspecting</li> <li>• Testing</li> </ul> <p>Recall applicable</p> <ul style="list-style-type: none"> <li>• Theory</li> <li>• Safety precautions</li> </ul>   |
| <i>References</i> you should study to gain the knowledge you need to perform this skill:                       | <ul style="list-style-type: none"> <li>• Ships' 3-M Manual, OPNAVINST 4790.4</li> <li>• NAVOSH Program Manual, OPNAVINST 5100.19</li> <li>• NSTM, Chapter 300, Electrical Plant General, NAVSEA S9086-KC-STM-010</li> <li>• NSTM, Chapter 320, Electric Power Distribution Systems, NAVSEA S9086-KY-STM-000</li> <li>• NSTM, Chapter 491, Electrical Measuring and Test Equipment, NAVSEA S9086-Q5-STM-000</li> <li>• NEETS, Modules 1, 2, 3, 4, 16, 19, 20, and 21</li> </ul> |
| <i>Exam Expectations.</i> These are subject areas you should know to help you answer exam questions correctly: | You can expect questions on the procedures for cleaning, inspecting, and testing components of ABTs including the applicable theory and safety precautions.  |

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| General EM <i>Skill Area</i>   | <b>Power Distribution</b>   |
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| <i>A skill</i> you are expected to perform from the General Skill Area above:                                  | <b>Perform corrective and planned maintenance on manual bus transfers (MBTs)</b>  |
| <i>Knowledge</i> you should have to perform this skill:  | <p>Identify the procedures to use when performing the following actions on components of MBTs:</p> <ul style="list-style-type: none"> <li>• Cleaning</li> <li>• Inspecting</li> <li>• Testing</li> <li>• Troubleshooting</li> <li>• Repairing</li> </ul> <p>Recall applicable</p> <ul style="list-style-type: none"> <li>• Theory</li> <li>• Safety precautions</li> </ul>          |
| <i>References</i> you should study to gain the knowledge you need to perform this skill:                       | <ul style="list-style-type: none"> <li>• Ships' 3-M Manual, OPNAVINST 4790.4</li> <li>• NAVOSH Program Manual, OPNAVINST 5100.19</li> <li>• NSTM, Chapter 300, Electrical Plant General, NAVSEA S9086-KC-STM-010</li> <li>• NSTM, Chapter 491, Electrical Measuring and Test Equipment, NAVSEA S9086-Q5-STM-000</li> <li>• NEETS, Modules 1, 2, 3, 4, 16, 19, 20, and 21</li> </ul> |
| <i>Exam Expectations.</i> These are subject areas you should know to help you answer exam questions correctly: | You can expect questions on the procedures for cleaning, inspecting, testing, troubleshooting, and repairing components of MBTs including the applicable theory and safety precautions.   |

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| General EM <i>Skill Area</i>   | <b>Power Distribution</b>  |
| A <i>skill</i> you are expected to perform from the General Skill Area above:                                  | <b>Perform corrective and planned maintenance on electrical distribution switchboards</b>  |
| <i>Knowledge</i> you should have to perform this skill:  | <p>Recall the procedures for performing the following tasks on electrical distribution switchboards:</p> <ul style="list-style-type: none"> <li>• Cleaning</li> <li>• Inspecting</li> <li>• Testing</li> </ul> <p>Identify applicable</p> <ul style="list-style-type: none"> <li>• Theory</li> <li>• Safety precautions</li> </ul>                 |
| <i>References</i> you should study to gain the knowledge you need to perform this skill:                       | <ul style="list-style-type: none"> <li>• Ships' 3-M Manual, OPNAVINST 4790.4</li> <li>• NAVOSH Program Manual, OPNAVINST 5100.19</li> <li>• NSTM, Chapters 300, 320, and 491</li> <li>• NEETS, Modules 1, 2, 3, 4, 16, 19, 20, and 21</li> <li>• Electrician's Mate, NAVEDTRA 12164</li> <li>• IC Electrician, Volume 1, NAVEDTRA 12160</li> </ul> |
| <i>Exam Expectations.</i> These are subject areas you should know to help you answer exam questions correctly: | You can expect questions about the procedures for cleaning, inspecting, and testing components on electrical distribution switchboards and all applicable theory and safety precautions.   |

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| General EM <i>Skill Area</i>   | <b>Power Distribution</b>   |
| A <i>skill</i> you are expected to perform from the General Skill Area above:                                  | <b>Perform planned maintenance for electrical power monitoring systems</b>  |
| <i>Knowledge</i> you should have to perform this skill:  | <p>Recall the procedures for performing the following tasks on electrical power monitoring systems:</p> <ul style="list-style-type: none"> <li>• Cleaning</li> <li>• Inspecting</li> <li>• Testing</li> </ul> <p>Identify applicable</p> <ul style="list-style-type: none"> <li>• Theory</li> <li>• Safety precautions</li> </ul> |
| <i>References</i> you should study to gain the knowledge you need to perform this skill:                       | <ul style="list-style-type: none"> <li>• Ships' 3-M Manual, OPNAVINST 4790.4</li> <li>• NAVOSH Program Manual, OPNAVINST 5100.19</li> <li>• NSTM, Chapters 300 and 491</li> <li>• NEETS, Modules 1, 2, 3, 4, 7, 16, 19, 20, and 21</li> <li>• Electrician's Mate, NAVEDTRA 12164</li> </ul>                                       |
| <i>Exam Expectations.</i> These are subject areas you should know to help you answer exam questions correctly: | You can expect questions on the procedures on cleaning, inspecting, and testing components for electrical power monitoring systems.   |

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| General EM <i>Skill Area</i>   | <b>Power Distribution</b>  |
| A <i>skill</i> you are expected to perform from the General Skill Area above:                                  | <b>Perform planned maintenance for casualty power systems</b>  |
| <i>Knowledge</i> you should have to perform this skill:  | <p>Recall the procedures for performing the following tasks on components of casualty power systems:</p> <ul style="list-style-type: none"> <li>• Cleaning</li> <li>• Inspecting</li> <li>• Testing</li> </ul> <p>Identify applicable</p> <ul style="list-style-type: none"> <li>• Theory</li> <li>• Safety precautions</li> </ul> |
| <i>References</i> you should study to gain the knowledge you need to perform this skill:                       | <ul style="list-style-type: none"> <li>• Ships' 3-M Manual, OPNAVINST 4790.4</li> <li>• NAVOSH Program Manual, OPNAVINST 5100.19</li> <li>• NSTM, Chapters 300 and 491</li> <li>• NEETS, Modules 1, 2, 3, 4, 7, 16, 19, 20, and 21</li> <li>• Electrician's Mate, NAVEDTRA 12164</li> </ul>  |
| <i>Exam Expectations.</i> These are subject areas you should know to help you answer exam questions correctly: | You can expect questions on the procedures on cleaning, inspecting, and testing components of casualty power systems.  |

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| General EM <i>Skill Area</i>   | <b>Power Distribution</b>  |
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| A <i>skill</i> you are expected to perform from the General Skill Area above:                                  | <b>Perform corrective and planned maintenance on power distribution systems</b>  |
| <i>Knowledge</i> you should have to perform this skill:  | <p>Recall the procedures for performing the following tasks on components of power distribution systems:</p> <ul style="list-style-type: none"> <li>• Cleaning</li> <li>• Inspecting</li> <li>• Testing</li> </ul> <p>Recall applicable</p> <ul style="list-style-type: none"> <li>• Theory</li> <li>• Safety precautions</li> </ul> |
| <i>References</i> you should study to gain the knowledge you need to perform this skill:                       | <ul style="list-style-type: none"> <li>• Ships' 3-M Manual, OPNAVINST 4790.4</li> <li>• NAVOSH Program Manual, OPNAVINST 5100.19</li> <li>• NSTM, Chapters 300, 320, and 491</li> <li>• NEETS, Modules 1, 2, 3, 4, 16, 19, 20, and 21</li> <li>• Electrician's Mate, NAVEDTRA 12164</li> </ul>                                       |
| <i>Exam Expectations.</i> These are subject areas you should know to help you answer exam questions correctly: | You should expect questions on cleaning, inspecting, and testing components in the power distribution systems including applicable theory and safety precautions.  |

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| General EM <i>Skill Area</i>   | <b>Power Distribution</b>  |
| A <i>skill</i> you are expected to perform from the General Skill Area above:                                  | <b>Perform corrective and planned maintenance on storage batteries</b>   |
| <i>Knowledge</i> you should have to perform this skill:  | <p>Recall the procedures used to accomplish the following actions on storage batteries:</p> <ul style="list-style-type: none"> <li>• Cleaning</li> <li>• Inspecting</li> <li>• Testing</li> </ul> <p>Recall applicable</p> <ul style="list-style-type: none"> <li>• Theory</li> <li>• Safety precautions</li> </ul>  |
| <i>References</i> you should study to gain the knowledge you need to perform this skill:                       | <ul style="list-style-type: none"> <li>• Ships' 3-M Manual, OPNAVINST 4790.4</li> <li>• NAVOSH Program Manual, OPNAVINST 5100.19</li> <li>• NSTM, Chapter 300, Electrical Plant General, NAVSEA S9086-KC-STM-010</li> <li>• NSTM, Chapter 313, Portable Storage and Dry Batteries, S9086-KR-STM-010</li> <li>• NEETS, Modules 1, 16, 19, 20, and 21</li> </ul> |
| <i>Exam Expectations.</i> These are subject areas you should know to help you answer exam questions correctly: | You can expect questions on the procedures for cleaning, inspecting and testing storage batteries including the applicable theory and safety precautions.  |

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| General EM <i>Skill Area</i>   | <b>Power Distribution</b>  |
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| <i>A skill</i> you are expected to perform from the General Skill Area above:                                  | <b>Perform corrective and planned maintenance on battery support systems</b>   |
| <i>Knowledge</i> you should have to perform this skill:  | <p>Recall the procedures used to accomplish the following actions on battery support systems:</p> <ul style="list-style-type: none"> <li>• Cleaning</li> <li>• Inspecting</li> <li>• Testing</li> </ul> <p>Recall applicable</p> <ul style="list-style-type: none"> <li>• Theory</li> <li>• Safety precautions</li> </ul>                                      |
| <i>References</i> you should study to gain the knowledge you need to perform this skill:                       | <ul style="list-style-type: none"> <li>• Ships' 3-M Manual, OPNAVINST 4790.4</li> <li>• NAVOSH Program Manual, OPNAVINST 5100.19</li> <li>• NSTM, Chapter 300, Electrical Plant General, NAVSEA S9086-KC-STM-010</li> <li>• NSTM, Chapter 313, Portable Storage and Dry Batteries, S9086-KR-STM-010</li> <li>• NEETS, Modules 1, 16, 19, 20, and 21</li> </ul> |
| <i>Exam Expectations.</i> These are subject areas you should know to help you answer exam questions correctly: | You can expect questions on the procedures for cleaning, inspecting, and testing battery support systems including the applicable theory and safety precautions.   |



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| General EM <i>Skill Area</i>   | <b>Motors And Generators</b>  |
| A <i>skill</i> you are expected to perform from the General Skill Area above:                                  | <b>Perform corrective and planned maintenance on ship's service generators (SSGs)</b>   |
| <i>Knowledge</i> you should have to perform this skill:  | <p>Identify the procedures to follow when performing the following actions on electrical components of SSGs:</p> <ul style="list-style-type: none"> <li>• Cleaning</li> <li>• Inspecting</li> <li>• Testing</li> </ul> <p>Recall applicable</p> <ul style="list-style-type: none"> <li>• Theory</li> <li>• Safety precautions</li> </ul>  |
| <i>References</i> you should study to gain the knowledge you need to perform this skill:                       | <ul style="list-style-type: none"> <li>• Ships' 3-M Manual, OPNAVINST 4790.4</li> <li>• NAVOSH Program Manual, OPNAVINST 5100.19</li> <li>• NSTM, Chapter 300, Electrical Plant General, NAVSEA S9086-KC-STM-010</li> <li>• NSTM, Chapter 310, Electric Power Generators and Conversion Equipment, NAVSEA S9086-KN-STM-010</li> <li>• NEETS, Modules 1 through 7, 16, 19, 20, and 21</li> </ul> |
| <i>Exam Expectations.</i> These are subject areas you should know to help you answer exam questions correctly: | You can expect questions on the procedures for cleaning, inspecting, and testing electrical components of the ship's service generator including applicable theory and safety precautions.  |

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| General EM <i>Skill Area</i>   | <b>Motors And Generators</b>  |
| A <i>skill</i> you are expected to perform from the General Skill Area above:                                  | <b>Perform planned maintenance on motor generator (MG) sets</b>   |
| <i>Knowledge</i> you should have to perform this skill:  | <p>Recall the procedures to use when performing the following actions on MG sets:</p> <ul style="list-style-type: none"> <li>• Cleaning</li> <li>• Inspecting</li> <li>• Testing</li> </ul> <p>Recall applicable</p> <ul style="list-style-type: none"> <li>• Theory</li> <li>• Safety precautions</li> </ul>   |
| <i>References</i> you should study to gain the knowledge you need to perform this skill:                       | <ul style="list-style-type: none"> <li>• Ships' 3-M Manual, OPNAVINST 4790.4</li> <li>• NAVOSH Program Manual, OPNAVINST 5100.19</li> <li>• NSTM, Chapter 300, Electrical Plant General, NAVSEA S9086-KC-STM-010</li> <li>• NSTM, Chapter 310, Electric Power Generators and Conversion Equipment, NAVSEA S9086-KN-STM-010</li> <li>• NEETS, Modules 1 through 7, 16, 19, 20, and 21</li> </ul> |
| <i>Exam Expectations.</i> These are subject areas you should know to help you answer exam questions correctly: | You can expect questions on the procedures for cleaning, inspecting, and testing MG sets including applicable theory and safety precautions.  |

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| General EM <i>Skill Area</i>   | <b>Motors And Generators</b>  |
| A <i>skill</i> you are expected to perform from the General Skill Area above:                                  | <b>Perform planned maintenance on electrical components of generator governor systems</b>   |
| <i>Knowledge</i> you should have to perform this skill:  | <p>Recall the procedures to use when performing the following actions on electrical components of generator governor systems:</p> <ul style="list-style-type: none"> <li>• Cleaning</li> <li>• Inspecting</li> <li>• Testing</li> </ul> <p>Recall applicable</p> <ul style="list-style-type: none"> <li>• Theory</li> <li>• Safety precautions</li> </ul>                                       |
| <i>References</i> you should study to gain the knowledge you need to perform this skill:                       | <ul style="list-style-type: none"> <li>• Ships' 3-M Manual, OPNAVINST 4790.4</li> <li>• NAVOSH Program Manual, OPNAVINST 5100.19</li> <li>• NSTM, Chapter 300, Electrical Plant General, NAVSEA S9086-KC-STM-010</li> <li>• NSTM, Chapter 310, Electric Power Generators and Conversion Equipment, NAVSEA S9086-KN-STM-010</li> <li>• NEETS, Modules 1 through 7, 16, 19, 20, and 21</li> </ul> |
| <i>Exam Expectations.</i> These are subject areas you should know to help you answer exam questions correctly: | You can expect questions on the procedures for cleaning, inspecting, and testing electrical components of generator governor systems including applicable theory and safety precautions.  |

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| General EM <i>Skill Area</i>   | <b>Motors And Generators</b>  |
| A <i>skill</i> you are expected to perform from the General Skill Area above:                                  | <b>Perform corrective and planned maintenance on components of AC motors</b>  |
| <i>Knowledge</i> you should have to perform this skill:  | <p>Recall the procedures to follow when performing the following actions on components of AC motors:</p> <ul style="list-style-type: none"> <li>• Cleaning</li> <li>• Inspecting</li> <li>• Testing</li> <li>• Troubleshooting</li> <li>• Repairing</li> </ul> <p>Recall applicable</p> <ul style="list-style-type: none"> <li>• Theory</li> <li>• Safety precautions</li> </ul>  |
| <i>References</i> you should study to gain the knowledge you need to perform this skill:                       | <ul style="list-style-type: none"> <li>• Ships' 3-M Manual, OPNAVINST 4790.4</li> <li>• NAVOSH Program Manual, OPNAVINST 5100.19</li> <li>• NSTM, Chapter 300, Electrical Plant General, NAVSEA S9086-KC-STM-010</li> <li>• NSTM, Chapter 302, Electric Motors and Controllers, NAVSEA S9086-K3-STM-000</li> <li>• NSTM, Chapter 491, Electrical Measuring and Test Equipment, NAVSEA S9086-Q5-STM-000</li> <li>• NEETS, Modules 1 through 5, 16, 19, 20, and 21</li> </ul> |
| <i>Exam Expectations.</i> These are subject areas you should know to help you answer exam questions correctly: | You can expect questions on the procedures for cleaning, inspecting, testing, troubleshooting, repairing, and replacing components of AC motors including applicable theory and safety precautions.   |

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| General EM <i>Skill Area</i>   | <b>Motors And Generators</b>  |
| A <i>skill</i> you are expected to perform from the General Skill Area above:                                  | <b>Perform planned maintenance on components of direct current (DC) generators</b>  |
| <i>Knowledge</i> you should have to perform this skill:  | <p>Identify the procedures to use when performing the following actions on components of DC generators:</p> <ul style="list-style-type: none"> <li>• Cleaning</li> <li>• Inspecting</li> <li>• Testing</li> </ul> <p>Recall applicable</p> <ul style="list-style-type: none"> <li>• Theory</li> <li>• Safety precautions</li> </ul>   |
| <i>References</i> you should study to gain the knowledge you need to perform this skill:                       | <ul style="list-style-type: none"> <li>• Ships' 3-M Manual, OPNAVINST 4790.4</li> <li>• NAVOSH Program Manual, OPNAVINST 5100.19</li> <li>• NSTM, Chapter 300, Electrical Plant General, NAVSEA S9086-KC-STM-010</li> <li>• NSTM, Chapter 310, Electric Power Generators and Conversion Equipment, NAVSEA S9086-KN-STM-010</li> <li>• NEETS, Modules 1 through 5, 16, 19, 20, and 21</li> </ul> |
| <i>Exam Expectations.</i> These are subject areas you should know to help you answer exam questions correctly: | You can expect questions on the procedures for cleaning, inspecting, and testing components of DC generators including applicable theory and safety precautions.  |

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| General EM <i>Skill Area</i>   | <b>Motors And Generators</b>   |
| A <i>skill</i> you are expected to perform from the General Skill Area above:                                  | <b>Perform corrective and planned maintenance on components of DC motors</b>   |
| <i>Knowledge</i> you should have to perform this skill:  | <p>Recall the procedures to use when performing the following actions on components of DC motors:</p> <ul style="list-style-type: none"> <li>• Cleaning</li> <li>• Inspecting</li> <li>• Testing</li> <li>• Troubleshooting</li> <li>• Repairing</li> <li>• Lubricating</li> </ul> <p>Recall applicable</p> <ul style="list-style-type: none"> <li>• Theory</li> <li>• Safety precautions</li> </ul> |
| <i>References</i> you should study to gain the knowledge you need to perform this skill:                       | <ul style="list-style-type: none"> <li>• Ships' 3-M Manual, OPNAVINST 4790.4</li> <li>• NAVOSH Program Manual, OPNAVINST 5100.19</li> <li>• NSTM, Chapter 300, Electrical Plant General, NAVSEA S9086-KC-STM-010</li> <li>• NSTM, Chapter 302, Electric Motors and Controllers, NAVSEA S9086-K3-STM-000</li> <li>• NEETS, Modules 1 through 5, 16, 19, 20, and 21</li> </ul>                         |
| <i>Exam Expectations.</i> These are subject areas you should know to help you answer exam questions correctly: | You can expect questions on the procedures for cleaning, inspecting, testing, troubleshooting, repairing, and lubricating components of DC motors including applicable theory and safety precautions.  |

## Advancement Handbook for EM3

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| General EM <i>Skill Area</i>   | <b>Lighting Systems</b>   |
| A <i>skill</i> you are expected to perform from the General Skill Area above:                                  | <b>Perform corrective and planned maintenance on components of the ship's general lighting systems</b>  |
| <i>Knowledge</i> you should have to perform this skill:  | <p>Identify the procedures listed in the following actions:</p> <ul style="list-style-type: none"> <li>• Cleaning</li> <li>• Inspecting</li> <li>• Testing</li> <li>• Installing</li> <li>• Troubleshooting</li> <li>• Repairing</li> </ul> <p>Recall applicable</p> <ul style="list-style-type: none"> <li>• Theory</li> <li>• Safety precautions</li> </ul> |
| <i>References</i> you should study to gain the knowledge you need to perform this skill:                       | <ul style="list-style-type: none"> <li>• Ships' 3-M Manual, OPNAVINST 4790.4</li> <li>• NAVOSH Program Manual, OPNAVINST 5100.19</li> <li>• NSTM, Chapters 300, 330, and 491</li> <li>• NEETS, Modules 1, 2, 3, 4, 16, 19, 20, and 21</li> <li>• Electrician's Mate, NAVEDTRA 12164</li> </ul>  |
| <i>Exam Expectations.</i> These are subject areas you should know to help you answer exam questions correctly: | You can expect questions to cover cleaning, inspecting, testing, installing, troubleshooting, and repairing components of the ship's general lighting systems including applicable theory and safety precautions.   |

## Advancement Handbook for EM3

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| General EM <i>Skill Area</i>   | <b>Lighting Systems</b>  |
| A <i>skill</i> you are expected to perform from the General Skill Area above:                                  | <b>Perform corrective and planned maintenance on components of the ship's navigation and signal lighting systems</b>   |
| <i>Knowledge</i> you should have to perform this skill:  | <p>Identify the procedures listed in the following actions for maintenance on components of the ship's navigation and signal lighting systems:</p> <ul style="list-style-type: none"> <li>• Cleaning</li> <li>• Inspecting</li> <li>• Testing</li> <li>• Troubleshooting</li> <li>• Repairing</li> </ul> <p>Recall applicable</p> <ul style="list-style-type: none"> <li>• Theory</li> <li>• Safety precautions</li> </ul> |
| <i>References</i> you should study to gain the knowledge you need to perform this skill:                       | <ul style="list-style-type: none"> <li>• Ships' 3-M Manual, OPNAVINST 4790.4</li> <li>• NAVOSH Program Manual, OPNAVINST 5100.19</li> <li>• NSTM, Chapters 300, 422, and 491</li> <li>• NEETS, Modules 1, 2, 3, 4, 16, 19, 20, and 21</li> <li>• Electrician's Mate, NAVEDTRA 12164</li> </ul>   |
| <i>Exam Expectations.</i> These are subject areas you should know to help you answer exam questions correctly: | You can expect questions about cleaning, inspecting, testing, troubleshooting, and repairing components of the ship's navigation and signal lighting systems including applicable theory and safety precautions.   |



## Advancement Handbook for EM3

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| General EM <i>Skill Area</i>   | <b>Lighting Systems</b>   |
| A <i>skill</i> you are expected to perform from the General Skill Area above:                                  | <b>Perform corrective and planned maintenance on components of the flight deck lighting systems</b>   |
| <i>Knowledge</i> you should have to perform this skill:  | <p>Identify the procedures for performing the following tasks related to maintenance of the flight deck lighting systems:</p> <ul style="list-style-type: none"> <li>• Cleaning</li> <li>• Inspecting</li> <li>• Testing</li> <li>• Troubleshooting</li> <li>• Repairing</li> </ul> <p>Recall applicable</p> <ul style="list-style-type: none"> <li>• Theory</li> <li>• Safety precautions</li> </ul> |
| <i>References</i> you should study to gain the knowledge you need to perform this skill:                       | <ul style="list-style-type: none"> <li>• Ships' 3-M Manual, OPNAVINST 4790.4</li> <li>• NAVOSH Program Manual, OPNAVINST 5100.19</li> <li>• NSTM, Chapters 300 and 491</li> <li>• NEETS, Modules 1, 2, 3, 4, 16, 19, 20, and 21</li> <li>• Electrician's Mate, NAVEDTRA 12164</li> </ul>  |
| <i>Exam Expectations.</i> These are subject areas you should know to help you answer exam questions correctly: | You can expect questions on the proper procedures for cleaning, inspecting, testing, troubleshooting, and repairing components of the flight deck lighting systems including applicable theory and safety precautions.  |

## Advancement Handbook for EM3

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| General EM <i>Skill Area</i>   | <b>Degaussing Systems</b>  |
| A <i>skill</i> you are expected to perform from the General Skill Area above:                                  | <b>Perform planned maintenance on components of Degaussing systems</b>   |
| <i>Knowledge</i> you should have to perform this skill:  | <p>Identify the procedures for performing the following tasks related to maintenance on components of Degaussing systems:</p> <ul style="list-style-type: none"> <li>• Cleaning</li> <li>• Inspecting</li> <li>• Testing</li> <li>• Replacing</li> </ul> <p>Recall applicable</p> <ul style="list-style-type: none"> <li>• Theory</li> <li>• Safety precautions</li> </ul> |
| <i>References</i> you should study to gain the knowledge you need to perform this skill:                       | <ul style="list-style-type: none"> <li>• Ships' 3-M Manual, OPNAVINST 4790.4</li> <li>• NAVOSH Program Manual, OPNAVINST 5100.19</li> <li>• NSTM, Chapters 300, 475, and 491</li> <li>• NEETS, Modules 1, 2, 3, 4, 6, 7, 8, 16, 19, 20, and 21</li> <li>• Electrician's Mate, NAVEDTRA 12164</li> </ul>  |
| <i>Exam Expectations.</i> These are subject areas you should know to help you answer exam questions correctly: | You can expect questions on the proper procedures for cleaning, inspecting, testing, and replacing components on a Degaussing system including applicable theory and safety precautions.   |

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| General EM <i>Skill Area</i>   | <b>Electrical Propulsion Control Consoles</b>   |
| A <i>skill</i> you are expected to perform from the General Skill Area above:                                  | <b>Perform planned maintenance on Propulsion Control Consoles</b>   |
| <i>Knowledge</i> you should have to perform this skill:  | <p>Identify the procedures for performing the following tasks related to maintenance of electrical propulsion control consoles:</p> <ul style="list-style-type: none"> <li>• Cleaning</li> <li>• Inspecting</li> <li>• Lubricating</li> </ul> <p>Recall applicable</p> <ul style="list-style-type: none"> <li>• Theory</li> <li>• Safety precautions</li> </ul> |
| <i>References</i> you should study to gain the knowledge you need to perform this skill:                       | <ul style="list-style-type: none"> <li>• Ships' 3-M Manual, OPNAVINST 4790.4</li> <li>• NAVOSH Program Manual, OPNAVINST 5100.19</li> <li>• NSTM, Chapters 300 and 491</li> <li>• NEETS, Modules 1, 2, 3, 4, 6, 7, 8, 13, 16, 19, 20, and 21</li> <li>• Electrician's Mate, NAVEDTRA 12164</li> </ul>   |
| <i>Exam Expectations.</i> These are subject areas you should know to help you answer exam questions correctly: | You can expect questions about the proper procedures for cleaning, inspecting, and lubricating electrical components of the electrical propulsion control consoles including applicable theory and safety precautions.  |

## Advancement Handbook for EM3

| General EM <i>Skill Area</i>   | <b>Auxiliary Electrical Equipment</b>   |
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| A <i>skill</i> you are expected to perform from the General Skill Area above:                                  | <b>Perform planned maintenance on Arc Fault Detector (AFD) Systems</b>  |
| <i>Knowledge</i> you should have to perform this skill:  | <p>Identify the procedures for performing the following tasks related to maintenance on Arc Fault Detector (AFD) Systems:</p> <ul style="list-style-type: none"> <li>• Cleaning</li> <li>• Inspecting</li> <li>• Testing</li> </ul> <p>Recall applicable</p> <ul style="list-style-type: none"> <li>• Theory</li> <li>• Safety precautions</li> </ul> |
| <i>References</i> you should study to gain the knowledge you need to perform this skill:                       | <ul style="list-style-type: none"> <li>• Ships' 3-M Manual, OPNAVINST 4790.4</li> <li>• NAVOSH Program Manual, OPNAVINST 5100.19</li> <li>• NSTM, Chapters 300, 320, and 491</li> <li>• NEETS, Modules 1, 2, 3, 4, 16, 19, 20, and 21</li> <li>• Electrician's Mate, NAVEDTRA 12164</li> </ul>  |
| <i>Exam Expectations.</i> These are subject areas you should know to help you answer exam questions correctly: | You can expect questions on cleaning, inspecting, and testing components of arc fault detector (AFD) systems. You will also need to know the theory and applicable safety procedures.   |

## Advancement Handbook for EM3

| General EM <i>Skill Area</i>   | <b>Auxiliary Electrical Equipment</b>   |
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| A <i>skill</i> you are expected to perform from the General Skill Area above:                                  | <b>Perform planned maintenance on circuit breakers</b>  |
| <i>Knowledge</i> you should have to perform this skill:  | <p>Identify the procedures for performing the following tasks related to maintenance on circuit breakers:</p> <ul style="list-style-type: none"> <li>• Cleaning</li> <li>• Inspecting</li> <li>• Testing</li> <li>• Troubleshooting</li> <li>• Repairing</li> </ul> <p>Recall applicable</p> <ul style="list-style-type: none"> <li>• Theory</li> <li>• Safety precautions</li> </ul> |
| <i>References</i> you should study to gain the knowledge you need to perform this skill:                       | <ul style="list-style-type: none"> <li>• Ships' 3-M Manual, OPNAVINST 4790.4</li> <li>• NAVOSH Program Manual, OPNAVINST 5100.19</li> <li>• NSTM, Chapters 300, 320, and 491</li> <li>• NEETS, Modules 1, 2, 3, 4, 16, 19, 20, and 21</li> <li>• Electrician's Mate, NAVEDTRA 12164</li> </ul>  |
| <i>Exam Expectations.</i> These are subject areas you should know to help you answer exam questions correctly: | You can expect questions on cleaning, inspecting, testing, troubleshooting, and repairing components of circuit breakers. You will also need to know the theory and applicable safety procedures.   |

## Advancement Handbook for EM3

| General EM <i>Skill Area</i>   | <b>Auxiliary Electrical Equipment</b>   |
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| <i>A skill</i> you are expected to perform from the General Skill Area above:                                  | <b>Perform corrective and planned maintenance on batteries</b>  |
| <i>Knowledge</i> you should have to perform this skill:  | <p>Recall the procedures used to accomplish the following actions on batteries:</p> <ul style="list-style-type: none"> <li>• Cleaning</li> <li>• Inspecting</li> <li>• Testing</li> <li>• Troubleshooting</li> <li>• Repairing</li> <li>• Charging</li> </ul> <p>Recall applicable</p> <ul style="list-style-type: none"> <li>• Theory</li> <li>• Safety precautions</li> </ul> |
| <i>References</i> you should study to gain the knowledge you need to perform this skill:                       | <ul style="list-style-type: none"> <li>• Ships' 3-M Manual, OPNAVINST 4790.4</li> <li>• NAVOSH Program Manual, OPNAVINST 5100.19</li> <li>• NSTM, Chapter 300, Electrical Plant General, NAVSEA S9086-KC-STM-010</li> <li>• NSTM, Chapter 313, Portable Storage and Dry Batteries, S9086-KR-STM-010</li> <li>• NEETS, Modules 1, 16, 19, 20, and 21</li> </ul>                  |
| <i>Exam Expectations.</i> These are subject areas you should know to help you answer exam questions correctly: | You can expect questions on the procedures for cleaning, inspecting, testing, troubleshooting, repairing, and charging batteries including the applicable theory and safety precautions.  |

## Advancement Handbook for EM3

| General EM <i>Skill Area</i>   | <b>Auxiliary Electrical Equipment</b>  |
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| A <i>skill</i> you are expected to perform from the General Skill Area above:                                  | <b>Perform corrective and planned maintenance on cathodic protection systems</b>   |
| <i>Knowledge</i> you should have to perform this skill:  | <p>Identify the procedures for performing the following tasks related to maintenance on cathodic protection systems:</p> <ul style="list-style-type: none"> <li>• Cleaning</li> <li>• Inspecting</li> <li>• Testing</li> <li>• Troubleshooting</li> <li>• Repairing</li> </ul> <p>Recall applicable</p> <ul style="list-style-type: none"> <li>• Theory</li> <li>• Safety precautions</li> </ul> |
| <i>References</i> you should study to gain the knowledge you need to perform this skill:                       | <ul style="list-style-type: none"> <li>• Ships' 3-M Manual, OPNAVINST 4790.4</li> <li>• NAVOSH Program Manual, OPNAVINST 5100.19</li> <li>• NSTM, Chapters 300, 491, and 633</li> <li>• NEETS, Modules 1, 2, 3, 4, 6, 7, 8, 16, 19, 20, and 21</li> <li>• Electrician's Mate, NAVEDTRA 12164</li> </ul>  |
| <i>Exam Expectations.</i> These are subject areas you should know to help you answer exam questions correctly: | You can expect questions covering cleaning, inspecting, testing, troubleshooting, and repairing components of cathodic protection systems including theory and applicable safety precautions.  |

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| General EM <i>Skill Area</i>   | <b>Auxiliary Electrical Equipment</b>   |
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| A <i>skill</i> you are expected to perform from the General Skill Area above:                                  | <b>Perform corrective and planned maintenance on components of the ship's steering control system</b>   |
| <i>Knowledge</i> you should have to perform this skill:  | <p>Identify the procedures for performing the following tasks related to maintenance on components of the ship's steering control system:</p> <ul style="list-style-type: none"> <li>• Cleaning</li> <li>• Inspecting</li> <li>• Testing</li> </ul> <p>Recall applicable</p> <ul style="list-style-type: none"> <li>• Theory</li> <li>• Safety precautions</li> </ul> |
| <i>References</i> you should study to gain the knowledge you need to perform this skill:                       | <ul style="list-style-type: none"> <li>• Ships' 3-M Manual, OPNAVINST 4790.4</li> <li>• NAVOSH Program Manual, OPNAVINST 5100.19</li> <li>• NSTM, Chapters 300, 491, and 562</li> <li>• NEETS, Modules 1, 2, 3, 4, 5, 7, 8, 11, 16, 19, 20, and 21</li> <li>• Electrician Mate's, NAVEDTRA 12164</li> </ul>   |
| <i>Exam Expectations.</i> These are subject areas you should know to help you answer exam questions correctly: | You can expect questions regarding cleaning, inspecting, and testing components of the ship's steering control system including theory and applicable safety precautions.   |



## Advancement Handbook for EM3

| General EM <i>Skill Area</i>   | <b>Auxiliary Electrical Equipment</b>   |
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| <i>A skill</i> you are expected to perform from the General Skill Area above:                                  | <b>Perform corrective and planned maintenance on magnetic controllers</b>   |
| <i>Knowledge</i> you should have to perform this skill:  | <p>Identify the procedures for performing the following tasks related to maintenance on magnetic controllers:</p> <ul style="list-style-type: none"> <li>• Cleaning</li> <li>• Inspecting</li> <li>• Testing</li> <li>• Troubleshooting</li> <li>• Repairing</li> </ul> <p>Recall applicable</p> <ul style="list-style-type: none"> <li>• Theory</li> <li>• Safety precautions</li> </ul> |
| <i>References</i> you should study to gain the knowledge you need to perform this skill:                       | <ul style="list-style-type: none"> <li>• Ships' 3-M Manual, OPNAVINST 4790.4</li> <li>• NAVOSH Program Manual, OPNAVINST 5100.19</li> <li>• NSTM, Chapters 300, 491, and 562</li> <li>• NEETS, Modules 1, 2, 3, 4, 5, 7, 8, 11, 16, 19, 20, and 21</li> <li>• Electrician Mate's, NAVEDTRA 12164</li> </ul>   |
| <i>Exam Expectations.</i> These are subject areas you should know to help you answer exam questions correctly: | You can expect questions regarding cleaning, inspecting, testing, troubleshooting, and repairing magnetic controllers including theory and applicable safety precautions.   |

## Advancement Handbook for EM3

| General EM <i>Skill Area</i>   | <b>Auxiliary Electrical Equipment</b>   |
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| A <i>skill</i> you are expected to perform from the General Skill Area above:                                  | <b>Perform corrective and planned maintenance on logic controllers PLC (Programmable Logic Controllers)</b>   |
| <i>Knowledge</i> you should have to perform this skill:  | <p>Identify the procedures for performing the following tasks related to maintenance on magnetic PLCs (Programmable Logic Controllers):</p> <ul style="list-style-type: none"> <li>• Cleaning</li> <li>• Inspecting</li> <li>• Testing</li> </ul> <p>Recall applicable</p> <ul style="list-style-type: none"> <li>• Theory</li> <li>• Safety precautions</li> </ul> |
| <i>References</i> you should study to gain the knowledge you need to perform this skill:                       | <ul style="list-style-type: none"> <li>• Ships' 3-M Manual, OPNAVINST 4790.4</li> <li>• NAVOSH Program Manual, OPNAVINST 5100.19</li> <li>• NSTM, Chapters 300 and 491</li> <li>• NEETS, Modules 1, 2, 3, 4, 5, 7, 8, 11, 16, 19, 20, and 21</li> <li>• Electrician Mate's, NAVEDTRA 12164</li> </ul>   |
| <i>Exam Expectations.</i> These are subject areas you should know to help you answer exam questions correctly: | You can expect questions regarding cleaning, inspecting, and testing Programmable Logic Controllers including theory and applicable safety precautions.   |

## Advancement Handbook for EM3

| General EM <i>Skill Area</i>   | <b>Auxiliary Electrical Equipment</b>   |
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| A <i>skill</i> you are expected to perform from the General Skill Area above:                                  | <b>Perform corrective and planned maintenance on remote valve control systems</b>   |
| <i>Knowledge</i> you should have to perform this skill:  | <p>Identify the procedures for performing the following tasks related to maintenance on remote valve control systems:</p> <ul style="list-style-type: none"> <li>• Cleaning</li> <li>• Inspecting</li> <li>• Testing</li> </ul> <p>Recall applicable</p> <ul style="list-style-type: none"> <li>• Theory</li> <li>• Safety precautions</li> </ul> |
| <i>References</i> you should study to gain the knowledge you need to perform this skill:                       | <ul style="list-style-type: none"> <li>• Ships' 3-M Manual, OPNAVINST 4790.4</li> <li>• NAVOSH Program Manual, OPNAVINST 5100.19</li> <li>• NSTM, Chapters 300 and 491</li> <li>• NEETS, Modules 1, 2, 3, 4, 5, 7, 8, 11, 16, 19, 20, and 21</li> <li>• Electrician Mate's, NAVEDTRA 12164</li> </ul>   |
| <i>Exam Expectations.</i> These are subject areas you should know to help you answer exam questions correctly: | You can expect questions regarding cleaning, inspecting, and testing components of remote valve control systems including theory and applicable safety precautions.   |

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| General EM <i>Skill Area</i>   | <b>Auxiliary Electrical Equipment</b>  |
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| A <i>skill</i> you are expected to perform from the General Skill Area above:                                  | <b>Perform corrective and planned maintenance on sensing and control electrical devices</b>  |
| <i>Knowledge</i> you should have to perform this skill:  | <p>Identify the procedures for performing the following tasks related to maintenance on sensing and control electrical devices (limit switches, rheostats, pressure switches, and temperature switches):</p> <ul style="list-style-type: none"> <li>• Cleaning</li> <li>• Inspecting</li> <li>• Testing</li> </ul> <p>Recall applicable</p> <ul style="list-style-type: none"> <li>• Theory</li> <li>• Safety precautions</li> </ul> |
| <i>References</i> you should study to gain the knowledge you need to perform this skill:                       | <ul style="list-style-type: none"> <li>• Ships' 3-M Manual, OPNAVINST 4790.4</li> <li>• NAVOSH Program Manual, OPNAVINST 5100.19</li> <li>• NSTM, Chapters 300, 320, 491, and 504</li> <li>• NEETS, Modules 1, 2, 3, 4, 16, 19, 20, and 21</li> <li>• Electrician's Mate, NAVEDTRA 12164</li> </ul>  |
| <i>Exam Expectations.</i> These are subject areas you should know to help you answer exam questions correctly: | You can expect questions on cleaning, inspecting, and testing sensing and control electrical devices including theory and applicable safety precautions.   |

## Advancement Handbook for EM3

| General EM <i>Skill Area</i>   | <b>Auxiliary Electrical Equipment</b>  |
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| A <i>skill</i> you are expected to perform from the General Skill Area above:                                  | <b>Perform corrective and planned maintenance on ventilation systems</b>   |
| <i>Knowledge</i> you should have to perform this skill:  | <p>Identify the procedures for performing the following tasks related to maintenance on ventilation systems:</p> <ul style="list-style-type: none"> <li>• Cleaning</li> <li>• Inspecting</li> <li>• Testing</li> </ul> <p>Recall applicable</p> <ul style="list-style-type: none"> <li>• Theory</li> <li>• Safety precautions</li> </ul> |
| <i>References</i> you should study to gain the knowledge you need to perform this skill:                       | <ul style="list-style-type: none"> <li>• Ships' 3-M Manual, OPNAVINST 4790.4</li> <li>• NAVOSH Program Manual, OPNAVINST 5100.19</li> <li>• NSTM, Chapters 300, 302, 491, 510, and 512</li> <li>• NEETS, Modules 1, 2, 3, 4, 5, 16, 19, 20, and 21</li> <li>• Electrician's Mate, NAVEDTRA 12164</li> </ul>                              |
| <i>Exam Expectations.</i> These are subject areas you should know to help you answer exam questions correctly: | You can expect questions on theory, safety precautions, and the proper procedures for cleaning, inspecting, and testing components of ventilation systems.   |

## Advancement Handbook for EM3

| General EM <i>Skill Area</i>   | <b>Auxiliary Electrical Equipment</b>   |
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| <i>A skill</i> you are expected to perform from the General Skill Area above:                                  | <b>Perform corrective and planned maintenance on components of ultrasonic cleaners</b>  |
| <i>Knowledge</i> you should have to perform this skill:  | <p>Recall the procedures to use when accomplishing the following actions on components of ultrasonic cleaners:</p> <ul style="list-style-type: none"> <li>• Cleaning</li> <li>• Inspecting</li> <li>• Testing</li> </ul> <p>Recall applicable</p> <ul style="list-style-type: none"> <li>• Theory</li> <li>• Safety precautions</li> </ul>  |
| <i>References</i> you should study to gain the knowledge you need to perform this skill:                       | <ul style="list-style-type: none"> <li>• Ships' 3-M Manual, OPNAVINST 4790.4</li> <li>• NAVOSH Program Manual, OPNAVINST 5100.19</li> <li>• NSTM, Chapter 300, Electrical Plant General, NAVSEA S9086-KC-STM-010</li> <li>• NSTM, Chapter 491, Electrical Measuring and Test Equipment, NAVSEA S9086-Q5-STM-000</li> <li>• NEETS, Modules 1, 2, 3, 4, 16, 19, 20, and 21</li> </ul> |
| <i>Exam Expectations.</i> These are subject areas you should know to help you answer exam questions correctly: | You can expect questions on the procedures for cleaning, inspecting, and testing ultrasonic cleaner components including applicable theory and safety precautions.  |

## Advancement Handbook for EM3

| General EM <i>Skill Area</i>   | <b>Auxiliary Electrical Equipment</b>  |
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| A <i>skill</i> you are expected to perform from the General Skill Area above:                                  | <b>Perform corrective and planned maintenance on components of chilled water systems</b>   |
| <i>Knowledge</i> you should have to perform this skill:  | <p>Recall the procedures to use when accomplishing the following actions on components of chilled water systems:</p> <ul style="list-style-type: none"> <li>• Cleaning</li> <li>• Inspecting</li> <li>• Testing</li> </ul> <p>Recall applicable</p> <ul style="list-style-type: none"> <li>• Theory</li> <li>• Safety precautions</li> </ul>   |
| <i>References</i> you should study to gain the knowledge you need to perform this skill:                       | <ul style="list-style-type: none"> <li>• Ships' 3-M Manual, OPNAVINST 4790.4</li> <li>• NAVOSH Program Manual, OPNAVINST 5100.19</li> <li>• NSTM, Chapter 300, Electrical Plant General, NAVSEA S9086-KC-STM-010</li> <li>• NSTM, Chapter 491, Electrical Measuring and Test Equipment, NAVSEA S9086-Q5-STM-000</li> <li>• NSTM, Chapter 510, Heating, Ventilating, and Air Conditioning Systems for Surface Ships</li> <li>• NEETS, Modules 1, 2, 3, 4, 16, 19, 20, and 21</li> </ul> |
| <i>Exam Expectations.</i> These are subject areas you should know to help you answer exam questions correctly: | You can expect questions on the procedures for cleaning, inspecting, and testing components of chilled water systems including applicable theory and safety precautions.   |

## Advancement Handbook for EM3

| General EM <i>Skill Area</i>   | <b>Auxiliary Electrical Equipment</b>  |
|--|--|
| A <i>skill</i> you are expected to perform from the General Skill Area above:                                  | <b>Perform corrective and planned maintenance on electrically operated valves</b>  |
| <i>Knowledge</i> you should have to perform this skill:  | <p>Identify the procedures for performing the following tasks related to maintenance on electrical components of electrically operated valves:</p> <ul style="list-style-type: none"> <li>• Cleaning</li> <li>• Inspecting</li> <li>• Testing</li> </ul> <p>Recall applicable</p> <ul style="list-style-type: none"> <li>• Theory</li> <li>• Safety precautions</li> </ul> |
| <i>References</i> you should study to gain the knowledge you need to perform this skill:                       | <ul style="list-style-type: none"> <li>• Ships' 3-M Manual, OPNAVINST 4790.4</li> <li>• NAVOSH Program Manual, OPNAVINST 5100.19</li> <li>• NSTM, Chapters 300, 491, and 555</li> <li>• NEETS, Modules 1, 2, 3, 4, 5, 7, 16, 19, 20, and 21</li> </ul>   |
| <i>Exam Expectations.</i> These are subject areas you should know to help you answer exam questions correctly: | You can expect questions covering the procedures for cleaning, inspecting, and testing components of electrically operated valves including theory and applicable safety precautions.  |



## Advancement Handbook for EM3

| General EM <i>Skill Area</i>   | <b>Auxiliary Electrical Equipment</b>  |
|--|--|
| <i>A skill</i> you are expected to perform from the General Skill Area above:                                  | <b>Perform corrective and planned maintenance on components of static converters</b>   |
| <i>Knowledge</i> you should have to perform this skill:  | <p>Recall the procedures to use when accomplishing the following actions on components of static converters:</p> <ul style="list-style-type: none"> <li>• Cleaning</li> <li>• Inspecting</li> <li>• Testing</li> </ul> <p>Recall applicable</p> <ul style="list-style-type: none"> <li>• Theory</li> <li>• Safety precautions</li> </ul>   |
| <i>References</i> you should study to gain the knowledge you need to perform this skill:                       | <ul style="list-style-type: none"> <li>• Ships' 3-M Manual, OPNAVINST 4790.4</li> <li>• NAVOSH Program Manual, OPNAVINST 5100.19</li> <li>• NSTM, Chapter 300, Electrical Plant General, NAVSEA S9086-KC-STM-010</li> <li>• NSTM, Chapter 310, Electric Power Generators and Conversion Equipment</li> <li>• NSTM, Chapter 491, Electrical Measuring and Test Equipment, NAVSEA S9086-Q5-STM-000</li> <li>• NEETS, Modules 1, 2, 3, 4, 16, 19, 20, and 21</li> </ul> |
| <i>Exam Expectations.</i> These are subject areas you should know to help you answer exam questions correctly: | You can expect questions on the procedures for cleaning, inspecting, and testing components of static converters including applicable theory and safety precautions.   |

## Advancement Handbook for EM3

| General EM <i>Skill Area</i>   | <b>Auxiliary Electrical Equipment</b>  |
|--|--|
| A <i>skill</i> you are expected to perform from the General Skill Area above:                                  | <b>Perform corrective and planned maintenance for precipitators</b>  |
| <i>Knowledge</i> you should have to perform this skill:  | <p>Identify the procedures for performing the following tasks related to maintenance on precipitator components:</p> <ul style="list-style-type: none"> <li>• Cleaning</li> <li>• Inspecting</li> <li>• Testing</li> </ul> <p>Recall applicable</p> <ul style="list-style-type: none"> <li>• Theory</li> <li>• Safety precautions</li> </ul> |
| <i>References</i> you should study to gain the knowledge you need to perform this skill:                       | <ul style="list-style-type: none"> <li>• Ships' 3-M Manual, OPNAVINST 4790.4</li> <li>• NAVOSH Program Manual, OPNAVINST 5100.19</li> <li>• NSTM, Chapters 300 and 491</li> <li>• NEETS, Modules 1, 2, 3, 4, 7, 16, 19, 20, and 21</li> <li>• Vent Fog Precipitator, S9514-DF-MMO-010</li> </ul>   |
| <i>Exam Expectations.</i> These are subject areas you should know to help you answer exam questions correctly: | You can expect questions covering cleaning, inspecting, and testing components of precipitators as well as theory and applicable safety precautions.   |

## Advancement Handbook for EM3

| General EM <i>Skill Area</i>   | <b>Auxiliary Electrical Equipment</b>   |
|--|---|
| A <i>skill</i> you are expected to perform from the General Skill Area above:                                  | <b>Perform corrective and planned maintenance for collecting and holding tank (CHT) Systems</b>   |
| <i>Knowledge</i> you should have to perform this skill:  | <p>Identify the procedures for performing the following tasks related to maintenance on electrical components of collection and holding tank (CHT) systems:</p> <ul style="list-style-type: none"> <li>• Cleaning</li> <li>• Inspecting</li> <li>• Testing</li> </ul> <p>Recall applicable</p> <ul style="list-style-type: none"> <li>• Theory</li> <li>• Safety precautions</li> </ul> |
| <i>References</i> you should study to gain the knowledge you need to perform this skill:                       | <ul style="list-style-type: none"> <li>• Ships' 3-M Manual, OPNAVINST 4790.4</li> <li>• NAVOSH Program Manual, OPNAVINST 5100.19</li> <li>• NSTM, Chapters 300, 491, and 593</li> <li>• NEETS, Modules 1, 2, 3, 4, 16, 19, 20, and 21</li> </ul>  |
| <i>Exam Expectations.</i> These are subject areas you should know to help you answer exam questions correctly: | You should know the proper procedures for cleaning, inspecting, and testing electrical components of the CHT systems including theory and applicable safety precautions.  |

## Advancement Handbook for EM3

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|--|---|
| General EM <i>Skill Area</i>   | <b>Auxiliary Electrical Equipment</b>   |
| A <i>skill</i> you are expected to perform from the General Skill Area above:                                  | <b>Perform planned maintenance on distilling plants</b>   |
| <i>Knowledge</i> you should have to perform this skill:  | <p>Recall the procedures used to accomplish the following actions on distilling plant electrical components:</p> <ul style="list-style-type: none"> <li>• Cleaning</li> <li>• Inspecting</li> <li>• Testing</li> </ul> <p>Recall applicable</p> <ul style="list-style-type: none"> <li>• Theory</li> <li>• Safety precautions</li> </ul>  |
| <i>References</i> you should study to gain the knowledge you need to perform this skill:                       | <ul style="list-style-type: none"> <li>• Ships' 3-M Manual, OPNAVINST 4790.4</li> <li>• NAVOSH Program Manual, OPNAVINST 5100.19</li> <li>• NSTM, Chapter 300, Electrical Plant General, NAVSEA S9086-KC-STM-010</li> <li>• NSTM, Chapter 491, Electrical Measuring and Test Equipment, NAVSEA S9086-Q5-STM-000</li> <li>• NSTM, Chapter 531 (Volumes 1, 2, and 3), Desalination Plants, S9086-SC-STM-010/020/030</li> <li>• NEETS, Modules 1, 2, 3, 4, 19, 20, and 21</li> </ul> |
| <i>Exam Expectations.</i> These are subject areas you should know to help you answer exam questions correctly: | You can expect questions on the procedures for cleaning, inspecting, and testing distilling plant electrical components including applicable theory and safety precautions.   |

## Advancement Handbook for EM3

| General EM <i>Skill Area</i>   | <b>Auxiliary Electrical Equipment</b>  |
|--|--|
| <i>A skill</i> you are expected to perform from the General Skill Area above:                                  | <b>Perform corrective and planned maintenance on components of static inverters</b>  |
| <i>Knowledge</i> you should have to perform this skill:  | <p>Recall the procedures to use when accomplishing the following actions on components of static inverters:</p> <ul style="list-style-type: none"> <li>• Cleaning</li> <li>• Inspecting</li> <li>• Testing</li> </ul> <p>Recall applicable</p> <ul style="list-style-type: none"> <li>• Theory</li> <li>• Safety precautions</li> </ul>  |
| <i>References</i> you should study to gain the knowledge you need to perform this skill:                       | <ul style="list-style-type: none"> <li>• Ships' 3-M Manual, OPNAVINST 4790.4</li> <li>• NAVOSH Program Manual, OPNAVINST 5100.19</li> <li>• NSTM, Chapter 300, Electrical Plant General, NAVSEA S9086-KC-STM-010</li> <li>• NSTM, Chapter 310, Electric Power Generators and Conversion Equipment</li> <li>• NSTM, Chapter 491, Electrical Measuring and Test Equipment, NAVSEA S9086-Q5-STM-000</li> <li>• NEETS, Modules 1, 2, 3, 4, 16, 19, 20, and 21</li> </ul> |
| <i>Exam Expectations.</i> These are subject areas you should know to help you answer exam questions correctly: | You can expect questions on the procedures for cleaning, inspecting, and testing components of static inverters including applicable theory and safety precautions.  |

## Advancement Handbook for EM3

| General EM <i>Skill Area</i>   | <b>Auxiliary Electrical Equipment</b>   |
|--|---|
| <i>A skill</i> you are expected to perform from the General Skill Area above:                                  | <b>Perform corrective and planned maintenance on capstans</b>   |
| <i>Knowledge</i> you should have to perform this skill:  | <p>Identify the procedures used to accomplish the following actions on capstans:</p> <ul style="list-style-type: none"> <li>• Cleaning</li> <li>• Inspecting</li> <li>• Testing</li> <li>• Troubleshooting</li> <li>• Repairing</li> </ul> <p>Recall applicable</p> <ul style="list-style-type: none"> <li>• Theory</li> <li>• Safety precautions</li> </ul>  |
| <i>References</i> you should study to gain the knowledge you need to perform this skill:                       | <ul style="list-style-type: none"> <li>• Ships' 3-M Manual, OPNAVINST 4790.4</li> <li>• NAVOSH Program Manual, OPNAVINST 5100.19</li> <li>• NSTM, Chapter 300, Electrical Plant General, NAVSEA S9086-KC-STM-010</li> <li>• NSTM, Chapter 491, Electrical Measuring and Test Equipment, NAVSEA S9086-Q5-STM-000</li> <li>• NEETS, Modules 1, 2, 3, 4, 16, 19, 20, and 21</li> <li>• Electrician's Mate, NAVEDTRA 12164</li> </ul> |
| <i>Exam Expectations.</i> These are subject areas you should know to help you answer exam questions correctly: | You can expect questions on the procedures for cleaning, inspecting, testing, troubleshooting, and repairing capstan electrical components including applicable theory and safety precautions.  |

## Advancement Handbook for EM3

| General EM <i>Skill Area</i>   | <b>Auxiliary Electrical Equipment</b>   |
|--|---|
| <i>A skill</i> you are expected to perform from the General Skill Area above:                                  | <b>Perform corrective and planned maintenance on windlasses</b>   |
| <i>Knowledge</i> you should have to perform this skill:  | Identify the procedures you should use to accomplish the following actions on windlasses: <ul style="list-style-type: none"> <li>• Cleaning</li> <li>• Inspecting</li> <li>• Testing</li> </ul><br>Recall applicable <ul style="list-style-type: none"> <li>• Theory</li> <li>• Safety precautions</li> </ul>   |
| <i>References</i> you should study to gain the knowledge you need to perform this skill:                       | <ul style="list-style-type: none"> <li>• Ships' 3-M Manual, OPNAVINST 4790.4</li> <li>• NAVOSH Program Manual, OPNAVINST 5100.19</li> <li>• NSTM, Chapter 300, Electrical Plant General, NAVSEA S9086-KC-STM-010</li> <li>• NSTM, Chapter 491, Electrical Measuring and Test Equipment, NAVSEA S9086-Q5-STM-000</li> <li>• NSTM, Chapter 581, Anchoring, S9086-TB-STM-010</li> <li>• NEETS, Modules 1, 2, 3, 4, 16, 19, 20, and 21</li> <li>• Electrician's Mate, NAVEDTRA 12164</li> </ul> |
| <i>Exam Expectations.</i> These are subject areas you should know to help you answer exam questions correctly: | You expect questions on the procedures for cleaning, inspecting, and testing electrical components on windlasses including theory and applicable safety precautions.  |

## Advancement Handbook for EM3

| General EM <i>Skill Area</i>   | <b>Auxiliary Electrical Equipment</b>  |
|--|--|
| A <i>skill</i> you are expected to perform from the General Skill Area above:                                  | <b>Perform planned maintenance on refrigeration systems</b>  |
| <i>Knowledge</i> you should have to perform this skill:  | <p>Identify the procedures you should use to perform the following actions on refrigeration systems:</p> <ul style="list-style-type: none"> <li>• Cleaning</li> <li>• Inspecting</li> <li>• Testing</li> <li>• Troubleshooting</li> <li>• Repairing</li> </ul> <p>Recall applicable</p> <ul style="list-style-type: none"> <li>• Theory</li> <li>• Safety procedures</li> </ul>  |
| <i>References</i> you should study to gain the knowledge you need to perform this skill:                       | <ul style="list-style-type: none"> <li>• Ships' 3-M Manual, OPNAVINST 4790.4</li> <li>• NAVOSH Program Manual, OPNAVINST 5100.19</li> <li>• NSTM, Chapter 300, Electrical Plant General, NAVSEA S9086-KC-STM-010</li> <li>• NSTM, Chapter 491, Electrical Measuring and Test Equipment, NAVSEA S9086-Q5-STM-000</li> <li>• NSTM, Chapter 516, Refrigeration Systems, S99086-RW-STM-010</li> <li>• NEETS, Modules 1, 2, 3, 4, 16, 19, 20, and 21</li> <li>• Electrician's Mate, NAVEDTRA 12164</li> </ul> |
| <i>Exam Expectations.</i> These are subject areas you should know to help you answer exam questions correctly: | You can expect questions on the procedures for cleaning, inspecting, testing, troubleshooting, and repairing refrigeration systems including applicable theory and safety precautions.   |



## Advancement Handbook for EM3

| General EM <i>Skill Area</i>   | <b>Auxiliary Electrical Equipment</b>  |
|--|--|
| <i>A skill</i> you are expected to perform from the General Skill Area above:                                  | <b>Perform planned maintenance on electrical components of air conditioning systems</b>  |
| <i>Knowledge</i> you should have to perform this skill:  | <p>Identify the procedures used to complete the following actions on electrical components of air conditioning systems:</p> <ul style="list-style-type: none"> <li>• Cleaning</li> <li>• Inspecting</li> <li>• Testing</li> <li>• Troubleshooting</li> <li>• Repairing</li> </ul> <p>Recall applicable</p> <ul style="list-style-type: none"> <li>• Theory</li> <li>• Safety precautions</li> </ul>  |
| <i>References</i> you should study to gain the knowledge you need to perform this skill:                       | <ul style="list-style-type: none"> <li>• Ships' 3-M Manual, OPNAVINST 4790.4</li> <li>• NAVOSH Program Manual, OPNAVINST 5100.19</li> <li>• NSTM, Chapter 300, Electrical Plant General, NAVSEA S9086-KC-STM-010</li> <li>• NSTM, Chapter 491, Electrical Measuring and Test Equipment, NAVSEA S9086-Q5-STM-000</li> <li>• NSTM, Chapter 510, Heating, Ventilating, and Air Conditioning Systems for Surface Ships, S9086-RQ-STM-010</li> <li>• NEETS, Modules 1, 2, 3, 4, 19, 20, and 21</li> </ul> |
| <i>Exam Expectations.</i> These are subject areas you should know to help you answer exam questions correctly: | You can expect questions on the procedures for cleaning, inspecting, testing, troubleshooting, and repairing air conditioning system electrical components including applicable theory and safety precautions.   |

## Advancement Handbook for EM3

| General EM <i>Skill Area</i>   | <b>Auxiliary Electrical Equipment</b>  |
|--|--|
| A <i>skill</i> you are expected to perform from the General Skill Area above:                                  | <b>Perform corrective and planned maintenance on air compressors</b>   |
| <i>Knowledge</i> you should have to perform this skill:  | <p>Identify the procedures to use when performing the following actions on air compressors:</p> <ul style="list-style-type: none"> <li>• Cleaning</li> <li>• Inspecting</li> <li>• Testing</li> <li>• Troubleshooting</li> <li>• Repairing</li> </ul> <p>Recall applicable</p> <ul style="list-style-type: none"> <li>• Theory</li> </ul> <p>Safety precautions</p>  |
| <i>References</i> you should study to gain the knowledge you need to perform this skill:                       | <ul style="list-style-type: none"> <li>• Ships' 3-M Manual, OPNAVINST 4790.4</li> <li>• NAVOSH Program Manual, OPNAVINST 5100.19</li> <li>• NSTM, Chapter 300, Electrical Plant General, NAVSEA S9086-KC-STM-010</li> <li>• NSTM, Chapter 491, Electrical Measuring and Test Equipment, NAVSEA S9086-Q5-STM-000</li> <li>• NSTM, Chapter 551, Compressed Air Plants and Systems, NAVSEA S9086-SY-STM-010</li> <li>• NEETS, Modules 1, 2, 3, 4, 16, 19, 20, and 21</li> <li>• Electrician's Mate, NAVEDTRA 12164</li> </ul> |
| <i>Exam Expectations.</i> These are subject areas you should know to help you answer exam questions correctly: | You can expect questions on the procedures for cleaning, inspecting, testing, troubleshooting, and repairing electrical components of air compressors including the applicable theory and safety procedures.   |

## Advancement Handbook for EM3

| General EM <i>Skill Area</i>   | <b>Auxiliary Electrical Equipment</b>   |
|--|---|
| A <i>skill</i> you are expected to perform from the General Skill Area above:                                  | <b>Perform corrective and planned maintenance on fire protection systems</b>  |
| <i>Knowledge</i> you should have to perform this skill:  | <p>Identify the procedures to use when performing the following actions on fire protection systems:</p> <ul style="list-style-type: none"> <li>• Cleaning</li> <li>• Inspecting</li> <li>• Testing</li> </ul> <p>Recall applicable</p> <ul style="list-style-type: none"> <li>• Theory</li> <li>• Safety precautions</li> </ul>   |
| <i>References</i> you should study to gain the knowledge you need to perform this skill:                       | <ul style="list-style-type: none"> <li>• Ships' 3-M Manual, OPNAVINST 4790.4</li> <li>• NAVOSH Program Manual, OPNAVINST 5100.19</li> <li>• NSTM, Chapter 300, Electrical Plant General, NAVSEA S9086-KC-STM-010</li> <li>• NSTM, Chapter 491, Electrical Measuring and Test Equipment, NAVSEA S9086-Q5-STM-000</li> <li>• NSTM, Chapter 551, Compressed Air Plants and Systems, NAVSEA S9086-SY-STM-010</li> <li>• NSTM, Chapter 555, Surface Ship Firefighting, Volumes 1 and 3</li> <li>• NEETS, Modules 1, 2, 3, 4, 16, 19, 20, and 21</li> <li>• Electrician's Mate, NAVEDTRA 12164</li> </ul> |
| <i>Exam Expectations.</i> These are subject areas you should know to help you answer exam questions correctly: | You can expect questions on the procedures for cleaning, inspecting, and testing electrical components of fire protection systems including the applicable theory and safety procedures.  |

## Advancement Handbook for EM3

| General EM <i>Skill Area</i>   | <b>Auxiliary Electrical Equipment</b>   |
|--|---|
| A <i>skill</i> you are expected to perform from the General Skill Area above:                                  | <b>Perform corrective and planned maintenance on electrical components of galley equipment</b>  |
| <i>Knowledge</i> you should have to perform this skill:  | <p>Identify the procedures to use to accomplish the following actions on galley equipment electrical components:</p> <ul style="list-style-type: none"> <li>• Cleaning</li> <li>• Inspecting</li> <li>• Testing</li> <li>• Troubleshooting</li> <li>• Repairing</li> </ul> <p>Recall applicable</p> <ul style="list-style-type: none"> <li>• Theory</li> <li>• Safety precautions</li> </ul>                                      |
| <i>References</i> you should study to gain the knowledge you need to perform this skill:                       | <ul style="list-style-type: none"> <li>• Ships' 3-M Manual, OPNAVINST 4790.4</li> <li>• NAVOSH Program Manual, OPNAVINST 5100.19</li> <li>• NSTM, Chapter 300, Electrical Plant General, NAVSEA S9086-KC-STM-010</li> <li>• NSTM, Chapter 491, Electrical Measuring and Test Equipment, NAVSEA S9086-Q5-STM-000</li> <li>• NEETS, Modules 1, 2, 3, 4, 16, 19, 20, and 21</li> <li>• Electrician's Mate, NAVEDTRA 12164</li> </ul> |
| <i>Exam Expectations.</i> These are subject areas you should know to help you answer exam questions correctly: | You can expect questions on the procedures for cleaning, inspecting, testing, troubleshooting, and repairing electrical components of galley equipment including the applicable theory and safety precautions.  |

## Advancement Handbook for EM3

| General EM <i>Skill Area</i>   | <b>Auxiliary Electrical Equipment</b>   |
|--|---|
| A <i>skill</i> you are expected to perform from the General Skill Area above:                                  | <b>Perform corrective and planned maintenance on mess deck equipment</b>  |
| <i>Knowledge</i> you should have to perform this skill:  | <p>Identify the procedures to use to accomplish the following actions on electrical components of mess deck equipment:</p> <ul style="list-style-type: none"> <li>• Cleaning</li> <li>• Inspecting</li> <li>• Testing</li> <li>• Troubleshooting</li> <li>• Repairing</li> </ul> <p>Recall applicable</p> <ul style="list-style-type: none"> <li>• Theory</li> <li>• Safety precautions</li> </ul>                                |
| <i>References</i> you should study to gain the knowledge you need to perform this skill:                       | <ul style="list-style-type: none"> <li>• Ships' 3-M Manual, OPNAVINST 4790.4</li> <li>• NAVOSH Program Manual, OPNAVINST 5100.19</li> <li>• NSTM, Chapter 300, Electrical Plant General, NAVSEA S9086-KC-STM-010</li> <li>• NSTM, Chapter 491, Electrical Measuring and Test Equipment, NAVSEA S9086-Q5-STM-000</li> <li>• NEETS, Modules 1, 2, 3, 4, 16, 19, 20, and 21</li> <li>• Electrician's Mate, NAVEDTRA 12164</li> </ul> |
| <i>Exam Expectations.</i> These are subject areas you should know to help you answer exam questions correctly: | You can expect questions on the procedures for cleaning, inspecting, testing, troubleshooting, and repairing mess deck equipment electrical components including the applicable theory and safety precautions.  |

## Advancement Handbook for EM3

| General EM <i>Skill Area</i>   | <b>Auxiliary Electrical Equipment</b>  |
|--|--|
| A <i>skill</i> you are expected to perform from the General Skill Area above:                                  | <b>Perform corrective and planned maintenance on scullery equipment</b>  |
| <i>Knowledge</i> you should have to perform this skill:  | <p>Identify the procedures to use to accomplish the following actions on scullery equipment electrical components:</p> <ul style="list-style-type: none"> <li>• Cleaning</li> <li>• Inspecting</li> <li>• Testing</li> <li>• Troubleshooting</li> <li>• Repairing</li> </ul> <p>Recall applicable</p> <ul style="list-style-type: none"> <li>• Theory</li> <li>• Safety precautions</li> </ul> |
| <i>References</i> you should study to gain the knowledge you need to perform this skill:                       | <ul style="list-style-type: none"> <li>• Ships' 3-M Manual, OPNAVINST 4790.4</li> <li>• NAVOSH Program Manual, OPNAVINST 5100.19</li> <li>• NSTM, Chapter 300, Electrical Plant General, NAVSEA S9086-KC-STM-010</li> <li>• NSTM, Chapter 491, Electrical Measuring and Test Equipment, NAVSEA S9086-Q5-STM-000</li> <li>• NEETS, Modules 1, 2, 3, 4, 16, 19, 20, and 21</li> </ul>            |
| <i>Exam Expectations.</i> These are subject areas you should know to help you answer exam questions correctly: | You can expect questions on the procedures for cleaning, inspecting, testing, troubleshooting, and repairing electrical components of scullery equipment including the applicable theory and safety precautions.   |

## Advancement Handbook for EM3

| General EM <i>Skill Area</i>   | <b>Auxiliary Electrical Equipment</b>   |
|--|---|
| <i>A skill</i> you are expected to perform from the General Skill Area above:                                  | <b>Perform corrective and planned maintenance on electrical components of laundry equipment</b>   |
| <i>Knowledge</i> you should have to perform this skill:  | <p>Identify procedures to use to accomplish the following actions on laundry equipment electrical components:</p> <ul style="list-style-type: none"> <li>• Cleaning</li> <li>• Inspecting</li> <li>• Testing</li> <li>• Troubleshooting</li> <li>• Repairing</li> </ul> <p>Recall applicable</p> <ul style="list-style-type: none"> <li>• Theory</li> <li>• Safety precautions</li> </ul> |
| <i>References</i> you should study to gain the knowledge you need to perform this skill:                       | <ul style="list-style-type: none"> <li>• Ships' 3-M Manual, OPNAVINST 4790.4</li> <li>• NAVOSH Program Manual, OPNAVINST 5100.19</li> <li>• NSTM, Chapter 300, Electrical Plant General, NAVSEA S9086-KC-STM-010</li> <li>• NSTM, Chapter 491, Electrical Measuring and Test Equipment, NAVSEA S9086-Q5-STM-000</li> <li>• NEETS, Modules 1, 2, 3, 4, 16, 19, 20, and 21</li> </ul>       |
| <i>Exam Expectations.</i> These are subject areas you should know to help you answer exam questions correctly: | You can expect questions on the procedures for cleaning, inspecting, testing, troubleshooting, and repairing electrical components of laundry equipment including theory and applicable safety precautions.   |

## Advancement Handbook for EM3

| General EM <i>Skill Area</i>   | <b>Auxiliary Electrical Equipment</b>   |
|--|---|
| A <i>skill</i> you are expected to perform from the General Skill Area above:                                  | <b>Perform corrective and planned maintenance on electrical components of ship's heating systems</b>  |
| <i>Knowledge</i> you should have to perform this skill:  | <p>Recognize the procedures to use when performing the following actions on ships' heating system electrical components:</p> <ul style="list-style-type: none"> <li>• Cleaning</li> <li>• Inspecting</li> <li>• Testing</li> </ul> <p>Recall applicable</p> <ul style="list-style-type: none"> <li>• Theory</li> <li>• Safety precautions</li> </ul>                                |
| <i>References</i> you should study to gain the knowledge you need to perform this skill:                       | <ul style="list-style-type: none"> <li>• Ships' 3-M Manual, OPNAVINST 4790.4</li> <li>• NAVOSH Program Manual, OPNAVINST 5100.19</li> <li>• NSTM, Chapter 300, Electrical Plant General, NAVSEA S9086-KC-STM-010</li> <li>• NSTM, Chapter 491, Electrical Measuring and Test Equipment, NAVSEA S9086-Q5-STM-000</li> <li>• NEETS, Modules 1, 2, 3, 4, 16, 19, 20, and 21</li> </ul> |
| <i>Exam Expectations.</i> These are subject areas you should know to help you answer exam questions correctly: | You can expect questions on the procedures for cleaning, inspecting, and testing electrical components of ship's heating systems including theory and the applicable safety precautions.  |



## Advancement Handbook for EM3

| General EM <i>Skill Area</i>   | <b>Auxiliary Electrical Equipment</b>   |
|--|---|
| <i>A skill</i> you are expected to perform from the General Skill Area above:                                  | <b>Perform corrective and planned maintenance on electrical components of welding equipment</b>   |
| <i>Knowledge</i> you should have to perform this skill:  | <p>Recognize the procedures to use to accomplish the following actions on welding equipment electrical components:</p> <ul style="list-style-type: none"> <li>• Cleaning</li> <li>• Inspecting</li> <li>• Testing</li> </ul> <p>Recall applicable</p> <ul style="list-style-type: none"> <li>• Theory</li> <li>• Safety precautions</li> </ul>                                      |
| <i>References</i> you should study to gain the knowledge you need to perform this skill:                       | <ul style="list-style-type: none"> <li>• Ships' 3-M Manual, OPNAVINST 4790.4</li> <li>• NAVOSH Program Manual, OPNAVINST 5100.19</li> <li>• NSTM, Chapter 300, Electrical Plant General, NAVSEA S9086-KC-STM-010</li> <li>• NSTM, Chapter 491, Electrical Measuring and Test Equipment, NAVSEA S9086-Q5-STM-000</li> <li>• NEETS, Modules 1, 2, 3, 4, 16, 19, 20, and 21</li> </ul> |
| <i>Exam Expectations.</i> These are subject areas you should know to help you answer exam questions correctly: | You can expect questions on cleaning, inspecting, and testing electrical components of welding including the theory and the applicable safety precautions.  |

## Advancement Handbook for EM3

| General EM <i>Skill Area</i>   | <b>Auxiliary Electrical Equipment</b>  |
|--|--|
| A <i>skill</i> you are expected to perform from the General Skill Area above:                                  | <b>Perform corrective and planned maintenance on soldered electrical connections</b>   |
| <i>Knowledge</i> you should have to perform this skill:  | <p>Recall the procedures to use when accomplishing the following actions on soldered electrical connections:</p> <ul style="list-style-type: none"> <li>• Cleaning</li> <li>• Inspecting</li> <li>• Replacing</li> </ul> <p>Recall applicable</p> <ul style="list-style-type: none"> <li>• Theory</li> <li>• Safety precautions</li> </ul> |
| <i>References</i> you should study to gain the knowledge you need to perform this skill:                       | <ul style="list-style-type: none"> <li>• Ships' 3-M Manual, OPNAVINST 4790.4</li> <li>• NAVOSH Program Manual, OPNAVINST 5100.19</li> <li>• NSTM, Chapter 300, Electrical Plant General, NAVSEA S9086-KC-STM-010</li> <li>• NSTM, Chapter 491, Electrical Measuring and Test Equipment, NAVSEA S9086-Q5-STM-000</li> </ul>                 |
| <i>Exam Expectations.</i> These are subject areas you should know to help you answer exam questions correctly: | You can expect questions on the procedures for cleaning, inspecting, and replacing soldered electrical connections including applicable theory and safety precautions.   |

## Advancement Handbook for EM3

| General EM <i>Skill Area</i>   | <b>Auxiliary Electrical Equipment</b>   |
|--|---|
| A <i>skill</i> you are expected to perform from the General Skill Area above:                                  | <b>Perform corrective and planned maintenance on common alarm systems</b>   |
| <i>Knowledge</i> you should have to perform this skill:  | <p>Recall the procedures to use when accomplishing the following actions on common alarm systems:</p> <ul style="list-style-type: none"> <li>• Cleaning</li> <li>• Inspecting</li> <li>• Testing</li> </ul> <p>Recall applicable</p> <ul style="list-style-type: none"> <li>• Theory</li> <li>• Safety precautions</li> </ul>   |
| <i>References</i> you should study to gain the knowledge you need to perform this skill:                       | <ul style="list-style-type: none"> <li>• Ships' 3-M Manual, OPNAVINST 4790.4</li> <li>• NAVOSH Program Manual, OPNAVINST 5100.19</li> <li>• NSTM, Chapter 300, Electrical Plant General, NAVSEA S9086-KC-STM-010</li> <li>• NSTM, Chapter 430, Interior Communications Installation, Interior Communications Installation</li> <li>• NSTM, Chapter 491, Electrical Measuring and Test Equipment, NAVSEA S9086-Q5-STM-000</li> <li>• NSTM, Chapter 504, Pressure, Temperature, and Other Mechanical and Electromechanical Measuring Instruments</li> </ul> |
| <i>Exam Expectations.</i> These are subject areas you should know to help you answer exam questions correctly: | You can expect questions on the procedures for cleaning, inspecting, and testing common alarm systems including applicable theory and safety precautions.   |

## Advancement Handbook for EM3

| General EM <i>Skill Area</i>   | <b>Auxiliary Electrical Equipment</b>  |
|--|--|
| A <i>skill</i> you are expected to perform from the General Skill Area above:                                  | <b>Perform corrective and planned maintenance on dehydrators</b>   |
| <i>Knowledge</i> you should have to perform this skill:  | <p>Recall the procedures to use when accomplishing the following actions on dehydrators:</p> <ul style="list-style-type: none"> <li>• Cleaning</li> <li>• Inspecting</li> <li>• Testing</li> </ul> <p>Recall applicable</p> <ul style="list-style-type: none"> <li>• Theory</li> <li>• Safety precautions</li> </ul>       |
| <i>References</i> you should study to gain the knowledge you need to perform this skill:                       | <ul style="list-style-type: none"> <li>• Ships' 3-M Manual, OPNAVINST 4790.4</li> <li>• NAVOSH Program Manual, OPNAVINST 5100.19</li> <li>• NSTM, Chapter 300, Electrical Plant General, NAVSEA S9086-KC-STM-010</li> <li>• NSTM, Chapter 491, Electrical Measuring and Test Equipment, NAVSEA S9086-Q5-STM-000</li> </ul> |
| <i>Exam Expectations.</i> These are subject areas you should know to help you answer exam questions correctly: | You can expect questions on the procedures for cleaning, inspecting, and testing dehydrators including applicable theory and safety precautions.   |

## Advancement Handbook for EM3

| General EM <i>Skill Area</i>   | <b>Auxiliary Electrical Equipment</b>   |
|--|---|
| <i>A skill</i> you are expected to perform from the General Skill Area above:                                  | <b>Perform corrective and planned maintenance on salinity indicating systems</b>  |
| <i>Knowledge</i> you should have to perform this skill:  | <p>Recall the procedures to use when accomplishing the following actions on salinity indicating systems:</p> <ul style="list-style-type: none"> <li>• Cleaning</li> <li>• Inspecting</li> <li>• Testing</li> </ul> <p>Recall applicable</p> <ul style="list-style-type: none"> <li>• Theory</li> <li>• Safety precautions</li> </ul>  |
| <i>References</i> you should study to gain the knowledge you need to perform this skill:                       | <ul style="list-style-type: none"> <li>• Ships' 3-M Manual, OPNAVINST 4790.4</li> <li>• NAVOSH Program Manual, OPNAVINST 5100.19</li> <li>• NSTM, Chapter 300, Electrical Plant – General, NAVSEA S9086-KC-STM-010</li> <li>• NSTM, Chapter 430, Interior Communications Installation, Interior Communications Installation</li> <li>• NSTM, Chapter 491, Electrical Measuring and Test Equipment, NAVSEA S9086-Q5-STM-000</li> </ul> |
| <i>Exam Expectations.</i> These are subject areas you should know to help you answer exam questions correctly: | You can expect questions on the procedures for cleaning, inspecting, and testing salinity indicating systems including applicable theory and safety precautions.  |

## Advancement Handbook for EM3

| General EM <i>Skill Area</i>   | <b>Auxiliary Electrical Equipment</b>   |
|--|---|
| <i>A skill</i> you are expected to perform from the General Skill Area above:                                  | <b>Perform corrective and planned maintenance on auxiliary (aux) boilers</b>  |
| <i>Knowledge</i> you should have to perform this skill:  | <p>Recall the procedures to use when accomplishing the following actions on auxiliary boilers:</p> <ul style="list-style-type: none"> <li>• Cleaning</li> <li>• Inspecting</li> <li>• Testing</li> </ul> <p>Recall applicable</p> <ul style="list-style-type: none"> <li>• Theory</li> <li>• Safety precautions</li> </ul>  |
| <i>References</i> you should study to gain the knowledge you need to perform this skill:                       | <ul style="list-style-type: none"> <li>• Ships' 3-M Manual, OPNAVINST 4790.4</li> <li>• NAVOSH Program Manual, OPNAVINST 5100.19</li> <li>• NSTM, Chapter 221, Boilers, NAVSEA S9086-GY-STM-010</li> <li>• NSTM, Chapter 300, Electrical Plant General, NAVSEA S9086-KC-STM-010</li> <li>• NSTM, Chapter 491, Electrical Measuring and Test Equipment, NAVSEA S9086-Q5-STM-000</li> </ul> |
| <i>Exam Expectations.</i> These are subject areas you should know to help you answer exam questions correctly: | You can expect questions on the procedures for cleaning, inspecting, and testing auxiliary boilers including applicable theory and safety precautions.  |

## Advancement Handbook for EM3

| General EM <i>Skill Area</i>   | <b>Auxiliary Electrical Equipment</b>   |
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| A <i>skill</i> you are expected to perform from the General Skill Area above:                                  | <b>Perform corrective and planned maintenance on shaft speed sensing, indication and engine order telegraph (EOT) components</b>  |
| <i>Knowledge</i> you should have to perform this skill:  | <p>Recall the procedures to use when accomplishing the following actions on shaft speed sensing, indication and engine order telegraph (EOT) components:</p> <ul style="list-style-type: none"> <li>• Cleaning</li> <li>• Inspecting</li> <li>• Testing</li> </ul> <p>Recall applicable</p> <ul style="list-style-type: none"> <li>• Theory</li> <li>• Safety precautions</li> </ul>  |
| <i>References</i> you should study to gain the knowledge you need to perform this skill:                       | <ul style="list-style-type: none"> <li>• Ships' 3-M Manual, OPNAVINST 4790.4</li> <li>• NAVOSH Program Manual, OPNAVINST 5100.19</li> <li>• NSTM, Chapter 300, Electrical Plant General, NAVSEA S9086-KC-STM-010</li> <li>• NSTM, Chapter 430, Interior Communications Installation, Interior Communications Installation</li> <li>• NSTM, Chapter 491, Electrical Measuring and Test Equipment, NAVSEA S9086-Q5-STM-000</li> </ul> |
| <i>Exam Expectations.</i> These are subject areas you should know to help you answer exam questions correctly: | You can expect questions on the procedures for cleaning, inspecting, and testing shaft speed sensing, indication and engine order telegraph (EOT) components including applicable theory and safety precautions.  |

## Part 2

### Advancement Handbook for EM2



## Advancement Handbook for EM2

|  |   |
|--|---|
| General EM <i>Skill Area</i>   | <b>Electrical Installations</b>   |
| A <i>skill</i> you are expected to perform from the General Skill Area above:                                  | <b>Perform planned maintenance on emergency shutdown systems</b>  |
| <i>Knowledge</i> you should have to perform this skill:  | <p>Recall the procedures to use performing the following action on emergency shutdown systems:</p> <ul style="list-style-type: none"> <li>• Testing</li> </ul> <p>Recall applicable</p> <ul style="list-style-type: none"> <li>• Theory</li> <li>• Safety precautions</li> </ul>      |
| <i>References</i> you should study to gain the knowledge you need to perform this skill:                       | <ul style="list-style-type: none"> <li>• Ships' 3-M Manual, OPNAVINST 4790.4</li> <li>• NAVOSH Program Manual, OPNAVINST 5100.19</li> <li>• NSTM, Chapter 300, Electrical Plant General, NAVSEA S9086-KC-STM-010</li> <li>• NEETS, Modules 1 through 5, 16, 19, 20, and 21</li> </ul> |
| <i>Exam Expectations.</i> These are subject areas you should know to help you answer exam questions correctly: | You can expect questions on the procedures for testing emergency shutdown systems including applicable theory and safety precautions.   |

## Advancement Handbook for EM2

| General EM <i>Skill Area</i>   | <b>Power Distribution</b>  |
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| <i>A skill</i> you are expected to perform from the General Skill Area above:                                  | <b>Perform planned maintenance on automatic bus transfers (ABTs)</b>   |
| <i>Knowledge</i> you should have to perform this skill:  | <p>Recognize the procedures to follow when performing the following actions on components of ABTs:</p> <ul style="list-style-type: none"> <li>• Troubleshooting</li> <li>• Repairing</li> </ul> <p>Recall applicable</p> <ul style="list-style-type: none"> <li>• Theory</li> <li>• Safety precautions</li> </ul>  |
| <i>References</i> you should study to gain the knowledge you need to perform this skill:                       | <ul style="list-style-type: none"> <li>• Ships' 3-M Manual, OPNAVINST 4790.4</li> <li>• NAVOSH Program Manual, OPNAVINST 5100.19</li> <li>• NSTM, Chapter 300, Electrical Plant General, NAVSEA S9086-KC-STM-010</li> <li>• NSTM, Chapter 320, Electric Power Distribution Systems, NAVSEA S9086-KY-STM-000</li> <li>• NSTM, Chapter 491, Electrical Measuring and Test Equipment, NAVSEA S9086-Q5-STM-000</li> <li>• NEETS, Modules 1, 2, 3, 4, 16, 19, 20, and 21</li> </ul> |
| <i>Exam Expectations.</i> These are subject areas you should know to help you answer exam questions correctly: | You can expect questions on the procedures for troubleshooting and repairing components of ABTs including the applicable theory and safety precautions.  |

## Advancement Handbook for EM2

| General EM <i>Skill Area</i>   | <b>Power Distribution</b>   |
|--|---|
| A <i>skill</i> you are expected to perform from the General Skill Area above:                                  | <b>Perform corrective and planned maintenance on electrical distribution switchboards</b>   |
| <i>Knowledge</i> you should have to perform this skill:  | <p>Recall the procedures for performing the following tasks on electrical distribution switchboards:</p> <ul style="list-style-type: none"> <li>• Testing</li> <li>• Operating</li> <li>• Troubleshooting</li> <li>• Repairing</li> </ul> <p>Identify applicable</p> <ul style="list-style-type: none"> <li>• Theory</li> <li>• Safety precautions</li> </ul> |
| <i>References</i> you should study to gain the knowledge you need to perform this skill:                       | <ul style="list-style-type: none"> <li>• Ships' (3-M) Manual, OPNAVINST 4790.4</li> <li>• NAVOSH Program Manual, OPNAVINST 5100.19</li> <li>• NSTM, Chapters 300, 320, and 491</li> <li>• NEETS, Modules 1, 2, 3, 4, 16, 19, 20, and 21</li> <li>• Electrician's Mate, NAVEDTRA 12164</li> <li>• IC Electrician, Volume 1, NAVEDTRA 12160</li> </ul>          |
| <i>Exam Expectations.</i> These are subject areas you should know to help you answer exam questions correctly: | You can expect questions about the procedures for testing, operating, troubleshooting, and repairing components on electrical distribution switchboards and all applicable theory and safety precautions.   |

## Advancement Handbook for EM2

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| General EM <i>Skill Area</i>   | <b>Power Distribution</b>   |
| A <i>skill</i> you are expected to perform from the General Skill Area above:                                  | <b>Perform planned maintenance for casualty power systems</b>   |
| <i>Knowledge</i> you should have to perform this skill:  | <p>Recall the procedures for performing the following tasks on components of casualty power systems:</p> <ul style="list-style-type: none"> <li>• Troubleshooting</li> <li>• Repairing</li> </ul> <p>Identify applicable</p> <ul style="list-style-type: none"> <li>• Theory</li> <li>• Safety precautions</li> </ul> |
| <i>References</i> you should study to gain the knowledge you need to perform this skill:                       | <ul style="list-style-type: none"> <li>• Ships' 3-M Manual, OPNAVINST 4790.4</li> <li>• NAVOSH Program Manual, OPNAVINST 5100.19</li> <li>• NSTM, Chapters 300 and 491</li> <li>• NEETS, Modules 1, 2, 3, 4, 7, 16, 19, 20, and 21</li> <li>• Electrician's Mate, NAVEDTRA 12164</li> </ul>                           |
| <i>Exam Expectations.</i> These are subject areas you should know to help you answer exam questions correctly: | You can expect questions on the procedures on troubleshooting and repairing components of casualty power systems.   |

## Advancement Handbook for EM2

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| General EM <i>Skill Area</i>   | <b>Power Distribution</b>   |
| A <i>skill</i> you are expected to perform from the General Skill Area above:                                  | <b>Perform corrective and planned maintenance on power distribution systems</b>   |
| <i>Knowledge</i> you should have to perform this skill:  | <p>Recall the procedures for performing the following tasks on components of power distribution systems:</p> <ul style="list-style-type: none"> <li>• Troubleshooting</li> <li>• Repairing</li> </ul> <p>Recall applicable</p> <ul style="list-style-type: none"> <li>• Theory</li> <li>• Safety precautions</li> </ul> |
| <i>References</i> you should study to gain the knowledge you need to perform this skill:                       | <ul style="list-style-type: none"> <li>• Ships' 3-M Manual, OPNAVINST 4790.4</li> <li>• NAVOSH Program Manual, OPNAVINST 5100.19</li> <li>• NSTM Chapters 300, 320, and 491</li> <li>• NEETS, Modules 1, 2, 3, 4, 16, 19, 20, and 21</li> <li>• Electrician's Mate, NAVEDTRA 12164</li> </ul>                           |
| <i>Exam Expectations.</i> These are subject areas you should know to help you answer exam questions correctly: | You should expect questions on troubleshooting and repairing components in the power distribution systems including applicable theory and safety precautions.   |

## Advancement Handbook for EM2

| General EM <i>Skill Area</i>   | <b>Power Distribution</b>  |
|--|--|
| <i>A skill</i> you are expected to perform from the General Skill Area above:                                  | <b>Perform corrective and planned maintenance on storage batteries</b>   |
| <i>Knowledge</i> you should have to perform this skill:  | <p>Recall the procedures used to accomplish the following actions on storage batteries:</p> <ul style="list-style-type: none"> <li>• Troubleshooting</li> <li>• Repairing</li> </ul> <p>Recall applicable</p> <ul style="list-style-type: none"> <li>• Theory</li> <li>• Safety precautions</li> </ul>   |
| <i>References</i> you should study to gain the knowledge you need to perform this skill:                       | <ul style="list-style-type: none"> <li>• Ships' 3-M Manual, OPNAVINST 4790.4</li> <li>• NAVOSH Program Manual, OPNAVINST 5100.19</li> <li>• NSTM, Chapter 300, Electrical Plant General, NAVSEA S9086-KC-STM-010</li> <li>• NSTM, Chapter 313, Portable Storage and Dry Batteries, S9086-KR-STM-010</li> <li>• NEETS, Modules 1, 16, 19, 20, and 21</li> </ul> |
| <i>Exam Expectations.</i> These are subject areas you should know to help you answer exam questions correctly: | You can expect questions on the procedures for troubleshooting and repairing storage batteries including the applicable theory and safety precautions.   |

## Advancement Handbook for EM2

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| General EM <i>Skill Area</i>   | <b>Power Distribution</b>  |
| A <i>skill</i> you are expected to perform from the General Skill Area above:                                  | <b>Perform corrective and planned maintenance on battery support systems</b>   |
| <i>Knowledge</i> you should have to perform this skill:  | <p>Recall the procedures used to accomplish the following actions on battery support systems:</p> <ul style="list-style-type: none"> <li>• Troubleshooting</li> <li>• Repairing</li> </ul> <p>Recall applicable</p> <ul style="list-style-type: none"> <li>• Theory</li> <li>• Safety precautions</li> </ul>   |
| <i>References</i> you should study to gain the knowledge you need to perform this skill:                       | <ul style="list-style-type: none"> <li>• Ships' 3-M Manual, OPNAVINST 4790.4</li> <li>• NAVOSH Program Manual, OPNAVINST 5100.19</li> <li>• NSTM, Chapter 300, Electrical Plant General, NAVSEA S9086-KC-STM-010</li> <li>• NSTM, Chapter 313, Portable Storage and Dry Batteries, S9086-KR-STM-010</li> <li>• NEETS, Modules 1, 16, 19, 20, and 21</li> </ul> |
| <i>Exam Expectations.</i> These are subject areas you should know to help you answer exam questions correctly: | You can expect questions on the procedures for troubleshooting and repairing battery support systems including the applicable theory and safety precautions.   |

## Advancement Handbook for EM2

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| General EM <i>Skill Area</i>   | <b>Motors And Generators</b>  |
| A <i>skill</i> you are expected to perform from the General Skill Area above:                                  | <b>Perform corrective and planned maintenance on ship's service generators (SSGs)</b>   |
| <i>Knowledge</i> you should have to perform this skill:  | <p>Identify the procedures to follow when performing the following actions on electrical components of SSGs:</p> <ul style="list-style-type: none"> <li>• Troubleshooting</li> <li>• Repairing</li> <li>• Testing</li> </ul> <p>Recall applicable</p> <ul style="list-style-type: none"> <li>• Theory</li> <li>• Safety precautions</li> </ul>  |
| <i>References</i> you should study to gain the knowledge you need to perform this skill:                       | <ul style="list-style-type: none"> <li>• Ships' 3-M Manual, OPNAVINST 4790.4</li> <li>• NAVOSH Program Manual, OPNAVINST 5100.19</li> <li>• NSTM, Chapter 300, Electrical Plant General, NAVSEA S9086-KC-STM-010</li> <li>• NSTM, Chapter 310, Electric Power Generators and Conversion Equipment, NAVSEA S9086-KN-STM-010</li> <li>• NEETS, Modules 1 through 7, 16, 19, 20, and 21</li> </ul> |
| <i>Exam Expectations.</i> These are subject areas you should know to help you answer exam questions correctly: | You can expect questions on the procedures for troubleshooting, repairing, and testing electrical components of the ship's service generator including applicable theory and safety precautions.  |



## Advancement Handbook for EM2

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| General EM <i>Skill Area</i>   | <b>Motors And Generators</b>  |
| A <i>skill</i> you are expected to perform from the General Skill Area above:                                  | <b>Perform planned maintenance on motor generator (MG) sets</b>   |
| <i>Knowledge</i> you should have to perform this skill:  | <p>Recall the procedures to use when performing the following actions on MG sets:</p> <ul style="list-style-type: none"> <li>• Testing</li> <li>• Troubleshooting</li> <li>• Repairing</li> </ul> <p>Recall applicable</p> <ul style="list-style-type: none"> <li>• Theory</li> <li>• Safety precautions</li> </ul>   |
| <i>References</i> you should study to gain the knowledge you need to perform this skill:                       | <ul style="list-style-type: none"> <li>• Ships' 3-M Manual, OPNAVINST 4790.4</li> <li>• NAVOSH Program Manual, OPNAVINST 5100.19</li> <li>• NSTM, Chapter 300, Electrical Plant General, NAVSEA S9086-KC-STM-010</li> <li>• NSTM, Chapter 310, Electric Power Generators and Conversion Equipment, NAVSEA S9086-KN-STM-010</li> <li>• NEETS, Modules 1 through 7, 16, 19, 20, and 21</li> </ul> |
| <i>Exam Expectations.</i> These are subject areas you should know to help you answer exam questions correctly: | You can expect questions on the procedures for testing, troubleshooting, and repairing MG sets including applicable theory and safety precautions.  |

## Advancement Handbook for EM2

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| General EM <i>Skill Area</i>   | <b>Motors And Generators</b>  |
| A <i>skill</i> you are expected to perform from the General Skill Area above:                                  | <b>Perform planned maintenance on components of direct current (DC) generators</b>  |
| <i>Knowledge</i> you should have to perform this skill:  | <p>Identify the procedures to use when performing the following actions on components of DC generators:</p> <ul style="list-style-type: none"> <li>• Troubleshooting</li> <li>• Repairing</li> </ul> <p>Recall applicable</p> <ul style="list-style-type: none"> <li>• Theory</li> <li>• Safety precautions</li> </ul>  |
| <i>References</i> you should study to gain the knowledge you need to perform this skill:                       | <ul style="list-style-type: none"> <li>• Ships' 3-M Manual, OPNAVINST 4790.4</li> <li>• NAVOSH Program Manual, OPNAVINST 5100.19</li> <li>• NSTM, Chapter 300, Electrical Plant General, NAVSEA S9086-KC-STM-010</li> <li>• NSTM, Chapter 310, Electric Power Generators and Conversion Equipment, NAVSEA S9086-KN-STM-010</li> <li>• NEETS, Modules 1 through 5, 16, 19, 20, and 21</li> </ul> |
| <i>Exam Expectations.</i> These are subject areas you should know to help you answer exam questions correctly: | You can expect questions on the procedures for troubleshooting and repairing components of DC generators including applicable theory and safety precautions.  |

## Advancement Handbook for EM2

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| General EM <i>Skill Area</i>   | <b>Degaussing Systems</b>  |
| A <i>skill</i> you are expected to perform from the General Skill Area above:                                  | <b>Perform planned maintenance on components of Degaussing systems</b>   |
| <i>Knowledge</i> you should have to perform this skill:  | <p>Identify the procedures for performing the following tasks related to maintenance on components of Degaussing systems:</p> <ul style="list-style-type: none"> <li>• Troubleshooting</li> <li>• Repairing</li> </ul> <p>Recall applicable</p> <ul style="list-style-type: none"> <li>• Theory</li> <li>• Safety precautions</li> </ul> |
| <i>References</i> you should study to gain the knowledge you need to perform this skill:                       | <ul style="list-style-type: none"> <li>• Ships' 3-M Manual, OPNAVINST 4790.4</li> <li>• NAVOSH Program Manual, OPNAVINST 5100.19</li> <li>• NSTM, Chapters 300, 475, and 491</li> <li>• NEETS, Modules 1, 2, 3, 4, 6, 7, 8, 16, 19, 20, and 21</li> <li>• Electrician's Mate, NAVEDTRA 12164</li> </ul>                                  |
| <i>Exam Expectations.</i> These are subject areas you should know to help you answer exam questions correctly: | You can expect questions on the proper procedures for troubleshooting and repairing components on a Degaussing system including applicable theory and safety precautions.  |

## Advancement Handbook for EM2

| General EM <i>Skill Area</i>   | <b>Auxiliary Electrical Equipment</b>  |
|--|--|
| <i>A skill</i> you are expected to perform from the General Skill Area above:                                  | <b>Perform planned maintenance on Arc Fault Detector (AFD) Systems</b>   |
| <i>Knowledge</i> you should have to perform this skill:  | <p>Identify the procedures for performing the following tasks related to maintenance on Arc Fault Detector (AFD) Systems:</p> <ul style="list-style-type: none"> <li>• Troubleshooting</li> <li>• Repairing</li> </ul> <p>Recall applicable</p> <ul style="list-style-type: none"> <li>• Theory</li> <li>• Safety precautions</li> </ul> |
| <i>References</i> you should study to gain the knowledge you need to perform this skill:                       | <ul style="list-style-type: none"> <li>• Ships' 3-M Manual, OPNAVINST 4790.4</li> <li>• NAVOSH Program Manual, OPNAVINST 5100.19</li> <li>• NSTM, Chapters 300, 320, and 491</li> <li>• NEETS, Modules 1, 2, 3, 4, 16, 19, 20, and 21</li> <li>• Electrician's Mate, NAVEDTRA 12164</li> </ul>   |
| <i>Exam Expectations.</i> These are subject areas you should know to help you answer exam questions correctly: | You can expect questions on troubleshooting and repairing components of arc fault detector (AFD) systems. You will also need to know the theory and applicable safety procedures.  |

## Advancement Handbook for EM2

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| General EM <i>Skill Area</i>   | <b>Auxiliary Electrical Equipment</b>  |
| A <i>skill</i> you are expected to perform from the General Skill Area above:                                  | <b>Perform corrective and planned maintenance on components of the ship's steering control system</b>  |
| <i>Knowledge</i> you should have to perform this skill:  | <p>Identify the procedures for performing the following tasks related to maintenance on components of the ship's steering control system:</p> <ul style="list-style-type: none"> <li>• Troubleshooting</li> <li>• Repairing</li> </ul> <p>Recall applicable</p> <ul style="list-style-type: none"> <li>• Theory</li> <li>• Safety precautions</li> </ul> |
| <i>References</i> you should study to gain the knowledge you need to perform this skill:                       | <ul style="list-style-type: none"> <li>• Ships' 3-M Manual, OPNAVINST 4790.4</li> <li>• NAVOSH Program Manual, OPNAVINST 5100.19</li> <li>• NSTM, Chapters 300, 491, and 562</li> <li>• NEETS, Modules 1, 2, 3, 4, 5, 7, 8, 11, 16, 19, 20, and 21</li> <li>• Electrician Mate's, NAVEDTRA 12164</li> </ul>  |
| <i>Exam Expectations.</i> These are subject areas you should know to help you answer exam questions correctly: | You can expect questions regarding troubleshooting and repairing components of the ship's steering control system including theory and applicable safety precautions.  |

## Advancement Handbook for EM2

| General EM <i>Skill Area</i>   | <b>Auxiliary Electrical Equipment</b>  |
|--|--|
| <i>A skill</i> you are expected to perform from the General Skill Area above:                                  | <b>Perform corrective and planned maintenance on remote valve control systems</b>  |
| <i>Knowledge</i> you should have to perform this skill:  | <p>Identify the procedures for performing the following tasks related to maintenance on remote valve control systems:</p> <ul style="list-style-type: none"> <li>• Adjusting</li> <li>• Troubleshooting</li> </ul> <p>Recall applicable</p> <ul style="list-style-type: none"> <li>• Theory</li> <li>• Safety precautions</li> </ul> |
| <i>References</i> you should study to gain the knowledge you need to perform this skill:                       | <ul style="list-style-type: none"> <li>• Ships' 3-M Manual, OPNAVINST 4790.4</li> <li>• NAVOSH Program Manual, OPNAVINST 5100.19</li> <li>• NSTM, Chapters 300 and 491</li> <li>• NEETS, Modules 1, 2, 3, 4, 5, 7, 8, 11, 16, 19, 20, and 21</li> <li>• Electrician Mate's, NAVEDTRA 12164</li> </ul>                                |
| <i>Exam Expectations.</i> These are subject areas you should know to help you answer exam questions correctly: | You can expect questions regarding adjusting and troubleshooting components of remote valve control systems including theory and applicable safety precautions.  |

## Advancement Handbook for EM2

| General EM <i>Skill Area</i>   | <b>Auxiliary Electrical Equipment</b>  |
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| <i>A skill</i> you are expected to perform from the General Skill Area above:                                  | <b>Perform corrective and planned maintenance on sensing and control electrical devices</b>  |
| <i>Knowledge</i> you should have to perform this skill:  | <p>Identify the procedures for performing the following tasks related to maintenance on sensing and control electrical devices:</p> <ul style="list-style-type: none"> <li>• Troubleshooting</li> <li>• Repairing</li> </ul> <p>Recall applicable</p> <ul style="list-style-type: none"> <li>• Theory</li> <li>• Safety precautions</li> </ul> |
| <i>References</i> you should study to gain the knowledge you need to perform this skill:                       | <ul style="list-style-type: none"> <li>• Ships' 3-M Manual, OPNAVINST 4790.4</li> <li>• NAVOSH Program Manual, OPNAVINST 5100.19</li> <li>• NSTM, Chapters 300, 320, 491, and 504</li> <li>• NEETS, Modules 1, 2, 3, 4, 16, 19, 20, and 21</li> <li>• Electrician's Mate, NAVEDTRA 12164</li> </ul>  |
| <i>Exam Expectations.</i> These are subject areas you should know to help you answer exam questions correctly: | You can expect questions on troubleshooting and repairing sensing and control electrical devices including theory and applicable safety precautions.   |

## Advancement Handbook for EM2

| General EM <i>Skill Area</i>   | <b>Auxiliary Electrical Equipment</b>   |
|--|---|
| A <i>skill</i> you are expected to perform from the General Skill Area above:                                  | <b>Perform corrective and planned maintenance on ventilation systems</b>  |
| <i>Knowledge</i> you should have to perform this skill:  | <p>Identify the procedures for performing the following tasks related to maintenance on ventilation systems:</p> <ul style="list-style-type: none"> <li>• Troubleshooting</li> <li>• Repairing</li> </ul> <p>Recall applicable</p> <ul style="list-style-type: none"> <li>• Theory</li> <li>• Safety precautions</li> </ul> |
| <i>References</i> you should study to gain the knowledge you need to perform this skill:                       | <ul style="list-style-type: none"> <li>• Ship' 3-M Manual, OPNAVINST 4790.4</li> <li>• NAVOSH Program Manual, OPNAVINST 5100.19</li> <li>• NSTM, Chapters 300, 302, 491, 510, and 512</li> <li>• NEETS, Modules 1, 2, 3, 4, 5, 16, 19, 20, and 21</li> <li>• Electrician's Mate, NAVEDTRA 12164</li> </ul>                  |
| <i>Exam Expectations.</i> These are subject areas you should know to help you answer exam questions correctly: | You can expect questions on theory, safety precautions, and the proper procedures for troubleshooting and repairing components of ventilation systems.  |



## Advancement Handbook for EM2

| General EM <i>Skill Area</i>   | <b>Auxiliary Electrical Equipment</b>   |
|--|---|
| <i>A skill</i> you are expected to perform from the General Skill Area above:                                  | <b>Perform corrective and planned maintenance on components of ultrasonic cleaners</b>  |
| <i>Knowledge</i> you should have to perform this skill:  | <p>Recall the procedures to use when accomplishing the following actions on components of ultrasonic cleaners:</p> <ul style="list-style-type: none"> <li>• Troubleshooting</li> <li>• Repairing</li> </ul> <p>Recall applicable</p> <ul style="list-style-type: none"> <li>• Theory</li> <li>• Safety precautions</li> </ul>   |
| <i>References</i> you should study to gain the knowledge you need to perform this skill:                       | <ul style="list-style-type: none"> <li>• Ships' 3-M Manual, OPNAVINST 4790.4</li> <li>• NAVOSH Program Manual, OPNAVINST 5100.19</li> <li>• NSTM, Chapter 300, Electrical Plant General, NAVSEA S9086-KC-STM-010</li> <li>• NSTM, Chapter 491, Electrical Measuring and Test Equipment, NAVSEA S9086-Q5-STM-000</li> <li>• NEETS, Modules 1, 2, 3, 4, 16, 19, 20, and 21</li> </ul> |
| <i>Exam Expectations.</i> These are subject areas you should know to help you answer exam questions correctly: | You can expect questions on the procedures for troubleshooting and repairing ultrasonic cleaner components including applicable theory and safety precautions.  |

## Advancement Handbook for EM2

| General EM <i>Skill Area</i>   | <b>Auxiliary Electrical Equipment</b>  |
|--|--|
| <i>A skill</i> you are expected to perform from the General Skill Area above:                                  | <b>Perform corrective and planned maintenance on components of chilled water systems</b>   |
| <i>Knowledge</i> you should have to perform this skill:  | <p>Recall the procedures to use when accomplishing the following actions on components of chilled water systems:</p> <ul style="list-style-type: none"> <li>• Troubleshooting</li> <li>• Repairing</li> </ul> <p>Recall applicable</p> <ul style="list-style-type: none"> <li>• Theory</li> <li>• Safety precautions</li> </ul>  |
| <i>References</i> you should study to gain the knowledge you need to perform this skill:                       | <ul style="list-style-type: none"> <li>• Ships' 3-M Manual, OPNAVINST 4790.4</li> <li>• NAVOSH Program Manual, OPNAVINST 5100.19</li> <li>• NSTM, Chapter 300, Electrical Plant General, NAVSEA S9086-KC-STM-010</li> <li>• NSTM, Chapter 491, Electrical Measuring and Test Equipment, NAVSEA S9086-Q5-STM-000</li> <li>• NSTM, Chapter 510, Heating, Ventilating, and Air Conditioning Systems for Surface Ships</li> <li>• NEETS, Modules 1, 2, 3, 4, 16, 19, 20, and 21</li> </ul> |
| <i>Exam Expectations.</i> These are subject areas you should know to help you answer exam questions correctly: | You can expect questions on the procedures for troubleshooting and repairing components of chilled water systems including applicable theory and safety precautions.   |

## Advancement Handbook for EM2

| General EM <i>Skill Area</i>   | <b>Auxiliary Electrical Equipment</b>   |
|--|---|
| <i>A skill</i> you are expected to perform from the General Skill Area above:                                  | <b>Perform corrective and planned maintenance on electrically operated valves</b>   |
| <i>Knowledge</i> you should have to perform this skill:  | <p>Identify the procedures for performing the following tasks related to maintenance on electrical components of electrically operated valves:</p> <ul style="list-style-type: none"> <li>• Troubleshooting</li> <li>• Repairing</li> </ul> <p>Recall applicable</p> <ul style="list-style-type: none"> <li>• Theory</li> <li>• Safety precautions</li> </ul> |
| <i>References</i> you should study to gain the knowledge you need to perform this skill:                       | <ul style="list-style-type: none"> <li>• Ships' 3-M Manual, OPNAVINST 4790.4</li> <li>• NAVOSH Program Manual, OPNAVINST 5100.19</li> <li>• NSTM, Chapters 300, 491, and 555</li> <li>• NEETS, Modules 1, 2, 3, 4, 5, 7, 16, 19, 20, and 21</li> </ul>  |
| <i>Exam Expectations.</i> These are subject areas you should know to help you answer exam questions correctly: | You can expect questions covering the procedures for troubleshooting and repairing components of electrically operated valves including theory and applicable safety precautions.   |

## Advancement Handbook for EM2

| General EM <i>Skill Area</i>   | <b>Auxiliary Electrical Equipment</b>   |
|--|---|
| A <i>skill</i> you are expected to perform from the General Skill Area above:                                  | <b>Perform corrective and planned maintenance for precipitators</b>   |
| <i>Knowledge</i> you should have to perform this skill:  | <p>Identify the procedures for performing the following tasks related to maintenance on precipitator components:</p> <ul style="list-style-type: none"> <li>• Troubleshooting</li> <li>• Repairing</li> </ul> <p>Recall applicable</p> <ul style="list-style-type: none"> <li>• Theory</li> <li>• Safety precautions</li> </ul> |
| <i>References</i> you should study to gain the knowledge you need to perform this skill:                       | <ul style="list-style-type: none"> <li>• Ships' 3-M Manual, OPNAVINST 4790.4</li> <li>• NAVOSH Program Manual, OPNAVINST 5100.19</li> <li>• NSTM, Chapters 300 and 491</li> <li>• NEETS, Modules 1, 2, 3, 4, 7, 16, 19, 20, and 21</li> <li>• Vent Fog Precipitator, S9514-DF-MMO-010</li> </ul>                                |
| <i>Exam Expectations.</i> These are subject areas you should know to help you answer exam questions correctly: | You can expect questions covering troubleshooting and repairing components of precipitators as well as theory and applicable safety precautions.  |

## Advancement Handbook for EM2

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| General EM <i>Skill Area</i>   | <b>Auxiliary Electrical Equipment</b>  |
| A <i>skill</i> you are expected to perform from the General Skill Area above:                                  | <b>Perform corrective and planned maintenance for collecting and holding tank (CHT) Systems</b>  |
| <i>Knowledge</i> you should have to perform this skill:  | <p>Identify the procedures for performing the following tasks related to maintenance on electrical components of collection and holding tank (CHT) systems:</p> <ul style="list-style-type: none"> <li>• Troubleshooting</li> <li>• Repairing</li> </ul> <p>Recall applicable</p> <ul style="list-style-type: none"> <li>• Theory</li> <li>• Safety precautions</li> </ul> |
| <i>References</i> you should study to gain the knowledge you need to perform this skill:                       | <ul style="list-style-type: none"> <li>• Ships' 3-M Manual, OPNAVINST 4790.4</li> <li>• NAVOSH Program Manual, OPNAVINST 5100.19</li> <li>• NSTM, Chapters 300, 491, and 593</li> <li>• NEETS, Modules 1, 2, 3, 4, 16, 19, 20, and 21</li> </ul>   |
| <i>Exam Expectations.</i> These are subject areas you should know to help you answer exam questions correctly: | You should know the proper procedures for troubleshooting and repairing electrical components of the CHT systems including theory and applicable safety precautions.   |

## Advancement Handbook for EM2

| General EM <i>Skill Area</i>   | <b>Auxiliary Electrical Equipment</b>  |
|--|--|
| <i>A skill</i> you are expected to perform from the General Skill Area above:                                  | <b>Perform corrective and planned maintenance on components of static converters</b>   |
| <i>Knowledge</i> you should have to perform this skill:  | <p>Recall the procedures to use when accomplishing the following actions on components of static converters:</p> <ul style="list-style-type: none"> <li>• Troubleshooting</li> <li>• Repairing</li> </ul> <p>Recall applicable</p> <ul style="list-style-type: none"> <li>• Theory</li> <li>• Safety precautions</li> </ul>  |
| <i>References</i> you should study to gain the knowledge you need to perform this skill:                       | <ul style="list-style-type: none"> <li>• Ships' 3-M Manual, OPNAVINST 4790.4</li> <li>• NAVOSH Program Manual, OPNAVINST 5100.19</li> <li>• NSTM, Chapter 300, Electrical Plant General, NAVSEA S9086-KC-STM-010</li> <li>• NSTM, Chapter 310, Electric Power Generators and Conversion Equipment</li> <li>• NSTM, Chapter 491, Electrical Measuring and Test Equipment, NAVSEA S9086-Q5-STM-000</li> <li>• NEETS, Modules 1, 2, 3, 4, 16, 19, 20, and 21</li> </ul> |
| <i>Exam Expectations.</i> These are subject areas you should know to help you answer exam questions correctly: | You can expect questions on the procedures for troubleshooting and repairing components of static converters including applicable theory and safety precautions.   |

## Advancement Handbook for EM2

| General EM <i>Skill Area</i>   | <b>Auxiliary Electrical Equipment</b>   |
|--|---|
| <i>A skill</i> you are expected to perform from the General Skill Area above:                                  | <b>Perform planned maintenance on distilling plants</b>   |
| <i>Knowledge</i> you should have to perform this skill:  | <p>Recall the procedures used to accomplish the following actions on distilling plant electrical components:</p> <ul style="list-style-type: none"> <li>• Troubleshooting</li> </ul> <p>Recall applicable</p> <ul style="list-style-type: none"> <li>• Theory</li> <li>• Safety precautions</li> </ul>  |
| <i>References</i> you should study to gain the knowledge you need to perform this skill:                       | <ul style="list-style-type: none"> <li>• Ships' 3-M Manual, OPNAVINST 4790.4</li> <li>• NAVOSH Program Manual, OPNAVINST 5100.19</li> <li>• NSTM, Chapter 300, Electrical Plant General, NAVSEA S9086-KC-STM-010</li> <li>• NSTM, Chapter 491, Electrical Measuring and Test Equipment, NAVSEA S9086-Q5-STM-000</li> <li>• NSTM, Chapter 531 (Volumes 1, 2, and 3), Desalination Plants, S9086-SC-STM-010/020/030</li> <li>• NEETS, Modules 1, 2, 3, 4, 19, 20, and 21</li> </ul> |
| <i>Exam Expectations.</i> These are subject areas you should know to help you answer exam questions correctly: | You can expect questions on the procedures for troubleshooting distilling plant electrical components including applicable theory and safety precautions.   |

## Advancement Handbook for EM2

| General EM <i>Skill Area</i>   | <b>Auxiliary Electrical Equipment</b>  |
|--|--|
| <i>A skill</i> you are expected to perform from the General Skill Area above:                                  | <b>Perform corrective and planned maintenance on components of static inverters</b>  |
| <i>Knowledge</i> you should have to perform this skill:  | <p>Recall the procedures to use when accomplishing the following actions on components of static inverters:</p> <ul style="list-style-type: none"> <li>• Troubleshooting</li> <li>• Repairing</li> </ul> <p>Recall applicable</p> <ul style="list-style-type: none"> <li>• Theory</li> <li>• Safety precautions</li> </ul>   |
| <i>References</i> you should study to gain the knowledge you need to perform this skill:                       | <ul style="list-style-type: none"> <li>• Ships' 3-M Manual, OPNAVINST 4790.4</li> <li>• NAVOSH Program Manual, OPNAVINST 5100.19</li> <li>• NSTM, Chapter 300, Electrical Plant General, NAVSEA S9086-KC-STM-010</li> <li>• NSTM, Chapter 310, Electric Power Generators and Conversion Equipment</li> <li>• NSTM, Chapter 491, Electrical Measuring and Test Equipment, NAVSEA S9086-Q5-STM-000</li> <li>• NEETS, Modules 1, 2, 3, 4, 16, 19, 20, and 21</li> </ul> |
| <i>Exam Expectations.</i> These are subject areas you should know to help you answer exam questions correctly: | You can expect questions on the procedures for troubleshooting and repairing components of static inverters including applicable theory and safety precautions.  |



## Advancement Handbook for EM2

| General EM <i>Skill Area</i>   | <b>Auxiliary Electrical Equipment</b>   |
|--|---|
| A <i>skill</i> you are expected to perform from the General Skill Area above:                                  | <b>Perform corrective and planned maintenance on windlasses</b>   |
| <i>Knowledge</i> you should have to perform this skill:  | <p>Identify the procedures you should use to accomplish the following actions on windlasses:</p> <ul style="list-style-type: none"> <li>• Troubleshooting</li> <li>• Repairing</li> </ul> <p>Recall applicable</p> <ul style="list-style-type: none"> <li>• Theory</li> <li>• Safety precautions</li> </ul>   |
| <i>References</i> you should study to gain the knowledge you need to perform this skill:                       | <ul style="list-style-type: none"> <li>• Ships' 3-M Manual, OPNAVINST 4790.4</li> <li>• NAVOSH Program Manual, OPNAVINST 5100.19</li> <li>• NSTM, Chapter 300, Electrical Plant General, NAVSEA S9086-KC-STM-010</li> <li>• NSTM, Chapter 491, Electrical Measuring and Test Equipment, NAVSEA S9086-Q5-STM-000</li> <li>• NSTM, Chapter 581, Anchoring, S9086-TB-STM-010</li> <li>• NEETS, Modules 1, 2, 3, 4, 16, 19, 20, and 21</li> <li>• Electrician's Mate, NAVEDTRA 12164</li> </ul> |
| <i>Exam Expectations.</i> These are subject areas you should know to help you answer exam questions correctly: | You expect questions on the procedures for troubleshooting and repairing electrical components on windlasses including theory and applicable safety precautions.  |

## Advancement Handbook for EM2

| General EM <i>Skill Area</i>   | <b>Auxiliary Electrical Equipment</b>   |
|--|---|
| <i>A skill</i> you are expected to perform from the General Skill Area above:                                  | <b>Perform corrective and planned maintenance on fire protection systems</b>  |
| <i>Knowledge</i> you should have to perform this skill:  | <p>Identify the procedures to use when performing the following actions on fire protection systems:</p> <ul style="list-style-type: none"> <li>• Troubleshooting</li> <li>• Repairing</li> </ul> <p>Recall applicable</p> <ul style="list-style-type: none"> <li>• Theory</li> <li>• Safety precautions</li> </ul>  |
| <i>References</i> you should study to gain the knowledge you need to perform this skill:                       | <ul style="list-style-type: none"> <li>• Ships' 3-M Manual, OPNAVINST 4790.4</li> <li>• NAVOSH Program Manual, OPNAVINST 5100.19</li> <li>• NSTM, Chapter 300, Electrical Plant General, NAVSEA S9086-KC-STM-010</li> <li>• NSTM, Chapter 491, Electrical Measuring and Test Equipment, NAVSEA S9086-Q5-STM-000</li> <li>• NSTM, Chapter 551, Compressed Air Plants and Systems, NAVSEA S9086-SY-STM-010</li> <li>• NSTM, Chapter 555, Surface Ship Firefighting, Volumes 1 and 3</li> <li>• NEETS, Modules 1, 2, 3, 4, 16, 19, 20, and 21</li> <li>• Electrician's Mate, NAVEDTRA 12164</li> </ul> |
| <i>Exam Expectations.</i> These are subject areas you should know to help you answer exam questions correctly: | You can expect questions on the procedures for troubleshooting and repairing electrical components of fire protection systems including the applicable theory and safety procedures.  |

## Advancement Handbook for EM2

| General EM <i>Skill Area</i>   | <b>Auxiliary Electrical Equipment</b>   |
|--|---|
| <i>A skill</i> you are expected to perform from the General Skill Area above:                                  | <b>Perform corrective and planned maintenance on electrical components of ship's heating systems</b>  |
| <i>Knowledge</i> you should have to perform this skill:  | <p>Recognize the procedures to use when performing the following actions on ships' heating system electrical components:</p> <ul style="list-style-type: none"> <li>• Troubleshooting</li> <li>• Repairing</li> </ul> <p>Recall applicable</p> <ul style="list-style-type: none"> <li>• Theory</li> <li>• Safety precautions</li> </ul>   |
| <i>References</i> you should study to gain the knowledge you need to perform this skill:                       | <ul style="list-style-type: none"> <li>• Ships' 3-M Manual, OPNAVINST 4790.4</li> <li>• NAVOSH Program Manual, OPNAVINST 5100.19</li> <li>• NSTM, Chapter 300, Electrical Plant General, NAVSEA S9086-KC-STM-010</li> <li>• NSTM, Chapter 491, Electrical Measuring and Test Equipment, NAVSEA S9086-Q5-STM-000</li> <li>• NEETS, Modules 1, 2, 3, 4, 16, 19, 20, and 21</li> </ul> |
| <i>Exam Expectations.</i> These are subject areas you should know to help you answer exam questions correctly: | You can expect questions on the procedures for troubleshooting and repairing electrical components of ship's heating systems including theory and the applicable safety precautions.  |

## Advancement Handbook for EM2

| General EM <i>Skill Area</i>   | <b>Auxiliary Electrical Equipment</b>   |
|--|---|
| <i>A skill</i> you are expected to perform from the General Skill Area above:                                  | <b>Perform corrective and planned maintenance on electrical components of welding equipment</b>   |
| <i>Knowledge</i> you should have to perform this skill:  | <p>Recognize the procedures to use to accomplish the following actions on welding equipment electrical components:</p> <ul style="list-style-type: none"> <li>• Troubleshooting</li> <li>• Repairing</li> </ul> <p>Recall applicable</p> <ul style="list-style-type: none"> <li>• Theory</li> <li>• Safety precautions</li> </ul>   |
| <i>References</i> you should study to gain the knowledge you need to perform this skill:                       | <ul style="list-style-type: none"> <li>• Ships' 3-M Manual, OPNAVINST 4790.4</li> <li>• NAVOSH Program Manual, OPNAVINST 5100.19</li> <li>• NSTM, Chapter 300, Electrical Plant General, NAVSEA S9086-KC-STM-010</li> <li>• NSTM, Chapter 491, Electrical Measuring and Test Equipment, NAVSEA S9086-Q5-STM-000</li> <li>• NEETS, Modules 1, 2, 3, 4, 16, 19, 20, and 21</li> </ul> |
| <i>Exam Expectations.</i> These are subject areas you should know to help you answer exam questions correctly: | You can expect questions on troubleshooting and repairing electrical components of welding including the theory and the applicable safety precautions.  |

## Advancement Handbook for EM2

| General EM <i>Skill Area</i>   | <b>Auxiliary Electrical Equipment</b>  |
|--|--|
| <i>A skill</i> you are expected to perform from the General Skill Area above:                                  | <b>Perform corrective and planned maintenance on dehydrators</b>   |
| <i>Knowledge</i> you should have to perform this skill:  | <p>Recall the procedures to use when accomplishing the following actions on dehydrators:</p> <ul style="list-style-type: none"> <li>• Troubleshooting</li> <li>• Repairing</li> </ul> <p>Recall applicable</p> <ul style="list-style-type: none"> <li>• Theory</li> <li>• Safety precautions</li> </ul>                    |
| <i>References</i> you should study to gain the knowledge you need to perform this skill:                       | <ul style="list-style-type: none"> <li>• Ships' 3-M Manual, OPNAVINST 4790.4</li> <li>• NAVOSH Program Manual, OPNAVINST 5100.19</li> <li>• NSTM, Chapter 300, Electrical Plant General, NAVSEA S9086-KC-STM-010</li> <li>• NSTM, Chapter 491, Electrical Measuring and Test Equipment, NAVSEA S9086-Q5-STM-000</li> </ul> |
| <i>Exam Expectations.</i> These are subject areas you should know to help you answer exam questions correctly: | You can expect questions on the procedures for troubleshooting and repairing dehydrators including applicable theory and safety precautions.   |

## Advancement Handbook for EM2

| General EM <i>Skill Area</i>   | <b>Auxiliary Electrical Equipment</b>  |
|--|--|
| <i>A skill</i> you are expected to perform from the General Skill Area above:                                  | <b>Perform corrective and planned maintenance on salinity indicating systems</b>   |
| <i>Knowledge</i> you should have to perform this skill:  | <p>Recall the procedures to use when accomplishing the following actions on salinity indicating systems:</p> <ul style="list-style-type: none"> <li>• Troubleshooting</li> <li>• Repairing</li> </ul> <p>Recall applicable</p> <ul style="list-style-type: none"> <li>• Theory</li> <li>• Safety precautions</li> </ul>  |
| <i>References</i> you should study to gain the knowledge you need to perform this skill:                       | <ul style="list-style-type: none"> <li>• Ships' 3-M Manual, OPNAVINST 4790.4</li> <li>• NAVOSH Program Manual, OPNAVINST 5100.19</li> <li>• NSTM, Chapter 300, Electrical Plant General, NAVSEA S9086-KC-STM-010</li> <li>• ? NSTM, Chapter 430, Interior Communications Installation, Interior Communications Installation,</li> <li>• NSTM, Chapter 491, Electrical Measuring and Test Equipment, NAVSEA S9086-Q5-STM-000</li> </ul> |
| <i>Exam Expectations.</i> These are subject areas you should know to help you answer exam questions correctly: | You can expect questions on the procedures for troubleshooting and repairing salinity indicating systems including applicable theory and safety precautions.   |

## Advancement Handbook for EM2

| General EM <i>Skill Area</i>   | <b>Auxiliary Electrical Equipment</b>   |
|--|---|
| <i>A skill</i> you are expected to perform from the General Skill Area above:                                  | <b>Perform corrective and planned maintenance on common alarm systems</b>   |
| <i>Knowledge</i> you should have to perform this skill:  | <p>Recall the procedures to use when accomplishing the following actions on common alarm systems:</p> <ul style="list-style-type: none"> <li>• Troubleshooting</li> <li>• Repairing</li> </ul> <p>Recall applicable</p> <ul style="list-style-type: none"> <li>• Theory</li> <li>• Safety precautions</li> </ul>  |
| <i>References</i> you should study to gain the knowledge you need to perform this skill:                       | <ul style="list-style-type: none"> <li>• Ships' 3-M Manual, OPNAVINST 4790.4</li> <li>• NAVOSH Program Manual, OPNAVINST 5100.19</li> <li>• NSTM, Chapter 300, Electrical Plant General, NAVSEA S9086-KC-STM-010</li> <li>• ? NSTM, Chapter 430, Interior Communications Installation, Interior Communications Installation</li> <li>• NSTM, Chapter 491, Electrical Measuring and Test Equipment, NAVSEA S9086-Q5-STM-000</li> </ul> |
| <i>Exam Expectations.</i> These are subject areas you should know to help you answer exam questions correctly: | You can expect questions on the procedures for troubleshooting and repairing common alarm systems including applicable theory and safety precautions.   |

## Advancement Handbook for EM2

| General EM <i>Skill Area</i>   | <b>Auxiliary Electrical Equipment</b>   |
|--|---|
| <i>A skill</i> you are expected to perform from the General Skill Area above:                                  | <b>Perform corrective and planned maintenance on auxiliary (aux) boilers</b>  |
| <i>Knowledge</i> you should have to perform this skill:  | <p>Recall the procedures to use when accomplishing the following actions on auxiliary boilers:</p> <ul style="list-style-type: none"> <li>• Troubleshooting</li> <li>• Repairing</li> </ul> <p>Recall applicable</p> <ul style="list-style-type: none"> <li>• Theory</li> <li>• Safety precautions</li> </ul>   |
| <i>References</i> you should study to gain the knowledge you need to perform this skill:                       | <ul style="list-style-type: none"> <li>• Ships' 3-M Manual, OPNAVINST 4790.4</li> <li>• NAVOSH Program Manual, OPNAVINST 5100.19</li> <li>• NSTM, Chapter 221, Boilers, NAVSEA S9086-GY-STM-010</li> <li>• NSTM, Chapter 300, Electrical Plant General, NAVSEA S9086-KC-STM-010</li> <li>• NSTM, Chapter 491, Electrical Measuring and Test Equipment, NAVSEA S9086-Q5-STM-000</li> </ul> |
| <i>Exam Expectations.</i> These are subject areas you should know to help you answer exam questions correctly: | You can expect questions on the procedures for troubleshooting and repairing auxiliary boilers including applicable theory and safety precautions.  |



## Advancement Handbook for EM2

| General EM <i>Skill Area</i>   | <b>Auxiliary Electrical Equipment</b>   |
|--|---|
| A <i>skill</i> you are expected to perform from the General Skill Area above:                                  | <b>Perform corrective and planned maintenance on shaft speed sensing, indication and engine order telegraph (EOT) components</b>  |
| <i>Knowledge</i> you should have to perform this skill:  | <p>Recall the procedures to use when accomplishing the following actions on shaft speed sensing, indication and engine order telegraph (EOT) components:</p> <ul style="list-style-type: none"> <li>• Troubleshooting</li> <li>• Repairing</li> </ul> <p>Recall applicable</p> <ul style="list-style-type: none"> <li>• Theory</li> <li>• Safety precautions</li> </ul>                       |
| <i>References</i> you should study to gain the knowledge you need to perform this skill:                       | <ul style="list-style-type: none"> <li>• Ships' 3-M Manual, OPNAVINST 4790.4</li> <li>• NAVOSH Program Manual, OPNAVINST 5100.19</li> <li>• NSTM, Chapter 300, Electrical Plant General, NAVSEA S9086-KC-STM-010</li> <li>• NSTM, Chapter 430, Interior Communications Installation</li> <li>• NSTM, Chapter 491, Electrical Measuring and Test Equipment, NAVSEA S9086-Q5-STM-000</li> </ul> |
| <i>Exam Expectations.</i> These are subject areas you should know to help you answer exam questions correctly: | You can expect questions on the procedures for troubleshooting and repairing shaft speed sensing, indication and engine order telegraph (EOT) components including applicable theory and safety precautions.  |

## Advancement Handbook for EM2

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| General EM <i>Skill Area</i>   | <b>Elevators And Conveyors</b>   |
| A <i>skill</i> you are expected to perform from the General Skill Area above:                                  | <b>Perform corrective and planned maintenance electrical components of conveyors</b>   |
| <i>Knowledge</i> you should have to perform this skill:  | <p>Recall the procedures to use when accomplishing the following actions on electrical components of elevators and conveyors:</p> <ul style="list-style-type: none"> <li>• Cleaning</li> <li>• Inspecting</li> <li>• Testing</li> </ul> <p>Recall applicable</p> <ul style="list-style-type: none"> <li>• Theory</li> <li>• Safety precautions</li> </ul>                            |
| <i>References</i> you should study to gain the knowledge you need to perform this skill:                       | <ul style="list-style-type: none"> <li>• Ships' 3-M Manual, OPNAVINST 4790.4</li> <li>• NAVOSH Program Manual, OPNAVINST 5100.19</li> <li>• NSTM, Chapter 300, Electrical Plant General, NAVSEA S9086-KC-STM-010</li> <li>• NSTM, Chapter 491, Electrical Measuring and Test Equipment, NAVSEA S9086-Q5-STM-000</li> <li>• NSTM, Chapter 722, Cargo and Weapons Elevators</li> </ul> |
| <i>Exam Expectations.</i> These are subject areas you should know to help you answer exam questions correctly: | You can expect questions on the procedures for cleaning, inspecting, and testing components of elevators and conveyors including applicable theory and safety precautions.   |

## Advancement Handbook for EM2

|  |  |
|--|--|
| General EM <i>Skill Area</i>   | <b>Elevators And Conveyors</b>   |
| A <i>skill</i> you are expected to perform from the General Skill Area above:                                  | <b>Perform corrective and planned maintenance electrical components of elevators and dumbwaiters</b>   |
| <i>Knowledge</i> you should have to perform this skill:  | <p>Recall the procedures to use when accomplishing the following actions on electrical components of elevators and conveyors:</p> <ul style="list-style-type: none"> <li>• Cleaning</li> <li>• Inspecting</li> <li>• Testing</li> </ul> <p>Recall applicable</p> <ul style="list-style-type: none"> <li>• Theory</li> <li>• Safety precautions</li> </ul>                            |
| <i>References</i> you should study to gain the knowledge you need to perform this skill:                       | <ul style="list-style-type: none"> <li>• Ships' 3-M Manual, OPNAVINST 4790.4</li> <li>• NAVOSH Program Manual, OPNAVINST 5100.19</li> <li>• NSTM, Chapter 300, Electrical Plant General, NAVSEA S9086-KC-STM-010</li> <li>• NSTM, Chapter 491, Electrical Measuring and Test Equipment, NAVSEA S9086-Q5-STM-000</li> <li>• NSTM, Chapter 722, Cargo and Weapons Elevators</li> </ul> |
| <i>Exam Expectations.</i> These are subject areas you should know to help you answer exam questions correctly: | You can expect questions on the procedures for cleaning, inspecting, and testing components of elevators and dumbwaiters including applicable theory and safety precautions.   |

## Advancement Handbook for EM2

| General EM <i>Skill Area</i>   | <b>Lifting Equipment</b>   |
|--|--|
| <i>A skill</i> you are expected to perform from the General Skill Area above:                                  | <b>Perform corrective and planned maintenance on electrical components of cranes</b>   |
| <i>Knowledge</i> you should have to perform this skill:  | <p>Recall the procedures to use when accomplishing the following actions on electrical components of cranes:</p> <ul style="list-style-type: none"> <li>• Cleaning</li> <li>• Inspecting</li> <li>• Testing</li> <li>• Troubleshooting</li> <li>• Repairing</li> </ul> <p>Recall applicable</p> <ul style="list-style-type: none"> <li>• Theory</li> <li>• Safety precautions</li> </ul> |
| <i>References</i> you should study to gain the knowledge you need to perform this skill:                       | <ul style="list-style-type: none"> <li>• Ships' 3-M Manual, OPNAVINST 4790.4</li> <li>• NAVOSH Program Manual, OPNAVINST 5100.19</li> <li>• NSTM, Chapter 300, Electrical Plant General, NAVSEA S9086-KC-STM-010</li> <li>• NSTM, Chapter 491, Electrical Measuring and Test Equipment, NAVSEA S9086-Q5-STM-000</li> <li>• NSTM, Chapter 589, Cranes</li> </ul>                          |
| <i>Exam Expectations.</i> These are subject areas you should know to help you answer exam questions correctly: | You can expect questions on the procedures for cleaning, inspecting, testing, troubleshooting, and repairing electrical components of cranes including applicable theory and safety precautions.   |

## Advancement Handbook for EM2

| General EM <i>Skill Area</i>   | <b>Lifting Equipment</b>   |
|--|--|
| <i>A skill</i> you are expected to perform from the General Skill Area above:                                  | <b>Perform corrective and planned maintenance on electrical hoist components</b>   |
| <i>Knowledge</i> you should have to perform this skill:  | <p>Recall the procedures to use when accomplishing the following actions on components of electrical hoists:</p> <ul style="list-style-type: none"> <li>• Cleaning</li> <li>• Inspecting</li> <li>• Testing</li> <li>• Troubleshooting</li> <li>• Repairing</li> </ul> <p>Recall applicable</p> <ul style="list-style-type: none"> <li>• Theory</li> <li>• Safety precautions</li> </ul> |
| <i>References</i> you should study to gain the knowledge you need to perform this skill:                       | <ul style="list-style-type: none"> <li>• Ships' 3-M Manual, OPNAVINST 4790.4</li> <li>• NAVOSH Program Manual, OPNAVINST 5100.19</li> <li>• NSTM, Chapter 300, Electrical Plant General, NAVSEA S9086-KC-STM-010</li> <li>• NSTM, Chapter 491, Electrical Measuring and Test Equipment, NAVSEA S9086-Q5-STM-000</li> <li>• NSTM, Chapter 589, Cranes</li> </ul>                          |
| <i>Exam Expectations.</i> These are subject areas you should know to help you answer exam questions correctly: | You can expect questions on the procedures for cleaning, inspecting, testing, troubleshooting, and repairing components of electrical hoists including applicable theory and safety precautions.   |

## Advancement Handbook for EM2

| General EM <i>Skill Area</i>   | <b>Lifting Equipment</b>  |
|--|---|
| <i>A skill</i> you are expected to perform from the General Skill Area above:                                  | <b>Perform corrective and planned maintenance on components of electrical winches</b>   |
| <i>Knowledge</i> you should have to perform this skill:  | <p>Recall the procedures to use when accomplishing the following actions on components of electrical winches:</p> <ul style="list-style-type: none"> <li>• Cleaning</li> <li>• Inspecting</li> <li>• Testing</li> <li>• Troubleshooting</li> <li>• Repairing</li> </ul> <p>Recall applicable</p> <ul style="list-style-type: none"> <li>• Theory</li> <li>• Safety precautions</li> </ul> |
| <i>References</i> you should study to gain the knowledge you need to perform this skill:                       | <ul style="list-style-type: none"> <li>• Ships' 3-M Manual, OPNAVINST 4790.4</li> <li>• NAVOSH Program Manual, OPNAVINST 5100.19</li> <li>• NSTM, Chapter 300, Electrical Plant General, NAVSEA S9086-KC-STM-010</li> <li>• NSTM, Chapter 491, Electrical Measuring and Test Equipment, NAVSEA S9086-Q5-STM-000</li> <li>• NSTM, Chapter 589, Cranes</li> </ul>                           |
| <i>Exam Expectations.</i> These are subject areas you should know to help you answer exam questions correctly: | You can expect questions on the procedures for cleaning, inspecting, testing, troubleshooting, and repairing components of electrical winches including applicable theory and safety precautions.   |

## Advancement Handbook for EM2

| General EM <i>Skill Area</i>   | <b>Small Craft</b>   |
|--|--|
| <i>A skill</i> you are expected to perform from the General Skill Area above:                                  | <b>Perform corrective and planned maintenance on small craft electrical systems</b>  |
| <i>Knowledge</i> you should have to perform this skill:  | <p>Recall the procedures to perform the following actions on small craft electrical systems and their electrical components:</p> <ul style="list-style-type: none"> <li>• Cleaning</li> <li>• Inspecting</li> <li>• Testing</li> <li>• Troubleshooting</li> <li>• Repairing</li> <li>• Removing/replacing</li> </ul> <p>Recall applicable</p> <ul style="list-style-type: none"> <li>• Theory</li> <li>• Safety precautions</li> </ul>                           |
| <i>References</i> you should study to gain the knowledge you need to perform this skill:                       | <ul style="list-style-type: none"> <li>• Ships' 3-M Manual, OPNAVINST 4790.4</li> <li>• NAVOSH Program Manual, OPNAVINST 5100.19</li> <li>• NSTM, Chapter 300, Electrical Plant General, NAVSEA S9086-KC-STM-010</li> <li>• NSTM, Chapter 491, Electrical Measuring and Test Equipment, NAVSEA S9086-Q5-STM-000</li> <li>• NSTM, Chapter 583, Boats and Small Craft, NAVSEA S9086-TX-STM-010</li> <li>• NEETS, Modules 1, 2, 3, 4, 16, 19, 20, and 21</li> </ul> |
| <i>Exam Expectations.</i> These are subject areas you should know to help you answer exam questions correctly: | You can expect questions on the procedures for cleaning, inspecting, testing, troubleshooting, repairing, removing, and replacing electrical components of small craft electrical systems including applicable theory and safety precautions.  |

## Part 3

### Advancement Handbook for EM1



## Advancement Handbook for EM1

|  |   |
|--|---|
| General EM <i>Skill Area</i>   | <b>Motors And Generators</b>  |
| A <i>skill</i> you are expected to perform from the General Skill Area above:                                  | <b>Perform planned maintenance on electrical components of generator governor systems</b>   |
| <i>Knowledge</i> you should have to perform this skill:  | <p>Recall the procedures to use when performing the following actions on electrical components of generator governor systems:</p> <ul style="list-style-type: none"> <li>• Troubleshooting</li> <li>• Repairing</li> </ul> <p>Recall applicable</p> <ul style="list-style-type: none"> <li>• Theory</li> <li>• Safety precautions</li> </ul>  |
| <i>References</i> you should study to gain the knowledge you need to perform this skill:                       | <ul style="list-style-type: none"> <li>• Ships' 3-M Manual, OPNAVINST 4790.4</li> <li>• NAVOSH Program Manual, OPNAVINST 5100.19</li> <li>• NSTM, Chapter 300, Electrical Plant General, NAVSEA S9086-KC-STM-010</li> <li>• NSTM, Chapter 310, Electric Power Generators and Conversion Equipment, NAVSEA S9086-KN-STM-010</li> <li>• NEETS, Modules 1 through 7, 16, 19, 20, and 21</li> </ul> |
| <i>Exam Expectations.</i> These are subject areas you should know to help you answer exam questions correctly: | You can expect questions on the procedures for troubleshooting and repairing electrical components of generator governor systems including applicable theory and safety precautions.  |

## Advancement Handbook for EM1

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| General EM <i>Skill Area</i>   | <b>Elevators And Conveyors</b>   |
| A <i>skill</i> you are expected to perform from the General Skill Area above:                                  | <b>Perform corrective and planned maintenance on electrical components of conveyors</b>  |
| <i>Knowledge</i> you should have to perform this skill:  | <p>Recall the procedures to use when accomplishing the following actions on electrical components of elevators and conveyors:</p> <ul style="list-style-type: none"> <li>• Troubleshooting</li> <li>• Repairing</li> </ul> <p>Recall applicable</p> <ul style="list-style-type: none"> <li>• Theory</li> <li>• Safety precautions</li> </ul>                       |
| <i>References</i> you should study to gain the knowledge you need to perform this skill:                       | <ul style="list-style-type: none"> <li>• Ships' 3-M Manual, OPNAVINST 4790.4</li> <li>• NAVOSH Program Manual, OPNAVINST 5100.19</li> <li>• NSTM, Chapter 300, Electrical Plant General, NAVSEA S9086-KC-STM-010</li> <li>• NSTM, Chapter 491, Electrical Measuring and Test Equipment, NAVSEA S9086-Q5-STM-000</li> <li>• NSTM, Chapter 581, Anchoring</li> </ul> |
| <i>Exam Expectations.</i> These are subject areas you should know to help you answer exam questions correctly: | You can expect questions on the procedures for troubleshooting and repairing components of elevators and conveyors including applicable theory and safety precautions.   |

## Advancement Handbook for EM1

|  |   |
|--|---|
| General EM <i>Skill Area</i>   | <b>Elevators And Conveyors</b>  |
| A <i>skill</i> you are expected to perform from the General Skill Area above:                                  | <b>Perform corrective and planned maintenance on electrical components of elevators and dumbwaiters</b>   |
| <i>Knowledge</i> you should have to perform this skill:  | <p>Recall the procedures to use when accomplishing the following actions on electrical components of elevators and dumbwaiters:</p> <ul style="list-style-type: none"> <li>• Troubleshooting</li> <li>• Repairing</li> </ul> <p>Recall applicable</p> <ul style="list-style-type: none"> <li>• Theory</li> <li>• Safety precautions</li> </ul>                  |
| <i>References</i> you should study to gain the knowledge you need to perform this skill:                       | <ul style="list-style-type: none"> <li>• Ships' 3-M Manual, OPNAVINST 4790.4</li> <li>• NAVOSH Program Manual, OPNAVINST 5100.19</li> <li>• NSTM, Chapter 300, Electrical Plant General, NAVSEA S9086-KC-STM-010</li> <li>• NSTM, Chapter 491, Electrical Measuring and Test Equipment, NAVSEA S9086-Q5-STM-000</li> <li>• NSTM, Chapter 589, Cranes</li> </ul> |
| <i>Exam Expectations.</i> These are subject areas you should know to help you answer exam questions correctly: | You can expect questions on the procedures for troubleshooting and repairing components of elevators and dumbwaiters including applicable theory and safety precautions.  |

## Advancement Handbook for EM1

| General EM <i>Skill Area</i>   | <b>Technical Administration</b>  |
|--|--|
| A <i>skill</i> you are expected to perform from the General Skill Area above:                                  | <b>Construct engineering casualty control drill scenarios</b>  |
| <i>Knowledge</i> you should have to perform this skill:  | Recall the procedures to use when constructing engineering casualty control drill scenarios.<br><br>Recall applicable <ul style="list-style-type: none"> <li>• Theory</li> <li>• Safety precautions</li> </ul>   |
| <i>References</i> you should study to gain the knowledge you need to perform this skill:                       | <ul style="list-style-type: none"> <li>• Ships' 3-M Manual, OPNAVINST 4790.4</li> <li>• NAVOSH Program Manual, OPNAVINST 5100.19</li> <li>• NSTM, Chapter 300, Electrical Plant General, NAVSEA S9086-KC-STM-010</li> <li>• NSTM, Chapter 491, Electrical Measuring and Test Equipment, NAVSEA S9086-Q5-STM-000</li> </ul> |
| <i>Exam Expectations.</i> These are subject areas you should know to help you answer exam questions correctly: | You can expect questions on the procedures for constructing engineering casualty control drill scenarios including applicable theory and safety precautions.   |

## Advancement Handbook for EM1

|  |  |
|--|--|
| General EM <i>Skill Area</i>   | <b>Technical Administration</b>  |
| A <i>skill</i> you are expected to perform from the General Skill Area above:                                  | <b>Update EOSS manuals</b>   |
| <i>Knowledge</i> you should have to perform this skill:  | <ul style="list-style-type: none"> <li>Recall the procedures to use when updating EOSS manuals</li> </ul> <p>Recall applicable</p> <ul style="list-style-type: none"> <li>Theory</li> <li>Safety precautions</li> </ul>  |
| <i>References</i> you should study to gain the knowledge you need to perform this skill:                       | <ul style="list-style-type: none"> <li>Ships' 3-M Manual, OPNAVINST 4790.4</li> <li>NAVOSH Program Manual, OPNAVINST 5100.19</li> <li>NSTM, Chapter 300, Electrical Plant General, NAVSEA S9086-KC-STM-010</li> <li>NSTM, Chapter 491, Electrical Measuring and Test Equipment, NAVSEA S9086-Q5-STM-000</li> </ul> |
| <i>Exam Expectations.</i> These are subject areas you should know to help you answer exam questions correctly: | You can expect questions on the procedures for updating EOSS manuals including applicable theory and safety precautions.   |

## Part 4

### Advancement Handbook for EMC

## Advancement Handbook for EMC

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| General EM <i>Skill Area</i>   | <b>Technical Administration</b>  |
| A <i>skill</i> you are expected to perform from the General Skill Area above:                                  | <b>Prepare Casualty Reports (CASREP)</b>   |
| <i>Knowledge</i> you should have to perform this skill:  | <p>Recall the procedures to use when preparing Casualty Reports (CASREP):</p> <ul style="list-style-type: none"> <li>• Drafting</li> <li>• Reviewing</li> </ul> <p>Recall applicable</p> <ul style="list-style-type: none"> <li>• Theory</li> <li>• Safety precautions</li> </ul>  |
| <i>References</i> you should study to gain the knowledge you need to perform this skill:                       | <ul style="list-style-type: none"> <li>• Ships' 3-M Manual, OPNAVINST 4790.4</li> <li>• NAVOSH Program Manual, OPNAVINST 5100.19</li> <li>• NSTM, Chapter 300, Electrical Plant General, NAVSEA S9086-KC-STM-010</li> <li>• NSTM, Chapter 491, Electrical Measuring and Test Equipment, NAVSEA S9086-Q5-STM-000</li> <li>• Operational Reports 1-03</li> </ul> |
| <i>Exam Expectations.</i> These are subject areas you should know to help you answer exam questions correctly: | You can expect questions on the procedures for drafting and reviewing casualty reports (CASREP) including applicable theory and safety precautions.  |

## Advancement Handbook for EMC

| General EM <i>Skill Area</i>   | <b>Technical Administration</b>  |
|--|--|
| A <i>skill</i> you are expected to perform from the General Skill Area above:                                  | <b>Prepare Casualty Correction (CASCOR) Reports</b>  |
| <i>Knowledge</i> you should have to perform this skill:  | <p>Recall the procedures to use when preparing Casualty Correction (CASCOR) Reports:</p> <ul style="list-style-type: none"> <li>• Drafting</li> <li>• Reviewing</li> </ul> <p>Recall applicable</p> <ul style="list-style-type: none"> <li>• Theory</li> <li>• Safety precautions</li> </ul>   |
| <i>References</i> you should study to gain the knowledge you need to perform this skill:                       | <ul style="list-style-type: none"> <li>• Ships' 3-M Manual, OPNAVINST 4790.4</li> <li>• NAVOSH Program Manual, OPNAVINST 5100.19</li> <li>• NSTM, Chapter 300, Electrical Plant General, NAVSEA S9086-KC-STM-010</li> <li>• NSTM, Chapter 491, Electrical Measuring and Test Equipment, NAVSEA S9086-Q5-STM-000</li> <li>• Operational Reports 1-03</li> </ul> |
| <i>Exam Expectations.</i> These are subject areas you should know to help you answer exam questions correctly: | You can expect questions on the procedures for drafting and reviewing casualty correction (CASCOR) reports including applicable theory and safety precautions.   |



## Advancement Handbook for EMC

| General EM <i>Skill Area</i>   | <b>Technical Administration</b>  |
|--|--|
| A <i>skill</i> you are expected to perform from the General Skill Area above:                                  | <b>Prepare Quality Assurance documents and perform Quality Assurance inspections</b>   |
| <i>Knowledge</i> you should have to perform this skill:  | <p>Recall the procedures to use preparing Quality Assurance documents or performing Quality Assurance inspections:</p> <ul style="list-style-type: none"> <li>• Preparing forms</li> <li>• Drafting reports</li> <li>• Conducting inspections</li> </ul> <p>Recall applicable</p> <ul style="list-style-type: none"> <li>• Theory</li> <li>• Safety precautions</li> </ul> |
| <i>References</i> you should study to gain the knowledge you need to perform this skill:                       | <ul style="list-style-type: none"> <li>• Ships' 3-M Manual, OPNAVINST 4790.3 Quality Assurance Manual</li> </ul>   |
| <i>Exam Expectations.</i> These are subject areas you should know to help you answer exam questions correctly: | You can expect questions on preparing Quality Assurance forms and reports and conducting Quality Assurance inspections including applicable theory and safety precautions.   |

## Advancement Handbook for EMC

| General EM <i>Skill Area</i>   | <b>Technical Administration</b>  |
|--|--|
| A <i>skill</i> you are expected to perform from the General Skill Area above:                                  | <b>Administer the Command's electrical safety program</b>  |
| <i>Knowledge</i> you should have to perform this skill:  | <ul style="list-style-type: none"> <li>• Recall the procedures to use when administering the command's electrical safety program</li> </ul> <p>Recall applicable</p> <ul style="list-style-type: none"> <li>• Theory</li> <li>• Safety precautions</li> </ul>  |
| <i>References</i> you should study to gain the knowledge you need to perform this skill:                       | <ul style="list-style-type: none"> <li>• Ships' 3-M Manual, OPNAVINST 4790.4</li> <li>• NAVOSH Program Manual, OPNAVINST 5100.19</li> <li>• NSTM, Chapter 300, Electrical Plant General, NAVSEA S9086-KC-STM-010</li> <li>• NSTM, Chapter 491, Electrical Measuring and Test Equipment, NAVSEA S9086-Q5-STM-000</li> </ul> |
| <i>Exam Expectations.</i> These are subject areas you should know to help you answer exam questions correctly: | You can expect questions on the procedures for administering the command's electrical safety program including applicable theory and safety precautions.   |

## Appendix 1

### References Used in This Advancement Handbook

| <b>Rating</b> | <b>Short Title</b>    | <b>Long Title</b>  | <b>Chapters/<br/>Paragraphs</b> | <b>Stocking<br/>Point</b> |
|---------------|-----------------------|--|---------------------------------|---------------------------|
| <b>EM3</b>    | NAVEDTRA B72-01-00-92 | Navy Electricity and Electronics Training Series (NEETS), Module 1, Introduction to Matter, Energy, and Direct Current |                                 | 4                         |
|               | NAVEDTRA 172-02-00-91 | NEETS, Module 2, Introduction to Alternating Current and Transformers  |                                 | 4                         |
|               | NAVEDTRA B72-03-00-93 | NEETS, Module 3, Circuit Protection, Control, and Measurement  |                                 | 4                         |
|               | NAVEDTRA B72-04-00-92 | NEETS, Module 4, Introduction to Electrical conductors, Wiring Techniques, and Schematic Reading                       |                                 | 4                         |
|               | NAVEDTRA B72-05-00-94 | NEETS, Module 5, Introduction to Generators and Motors   |                                 | 4                         |
|               | NAVEDTRA B72-06-00-92 | NEETS, Module 6, Introduction to Electronic Emission, Tubes, and Power Supplies  |                                 | 4                         |
|               | NAVEDTRA B72-07-00-92 | NEETS, Module 7, Introduction to Solid-State Devices and Power Supplies  |                                 | 4                         |
|               | NAVEDTRA 172-08-00-82 | NEETS, Module 8, Introduction to Amplifiers  |                                 | 4                         |
|               | NAVEDTRA 172-11-0087  | NEETS, Module 11, Microwave Principles   |                                 | 4                         |

|  |                       |   |  |   |
|--|-----------------------|---|--|---|
|  | NAVEDTRA B72-13-00-94 | NEETS, Module 13, Introduction to Number Systems and Logic Circuits |  | 4 |
|  | NAVEDTRA 172-14-00-84 | NEETS, Module 14, Introduction to Microelectronics                  |  | 4 |
|  | NAVEDTRA B72-16-00-96 | NEETS, Module 16, Introduction to Test Equipment                    |  | 4 |
|  | NAVEDTRA B72-19-00-92 | NEETS, Module 19, The Technician's Handbook                         |  | 4 |
|  | NAVEDTRA 172-20-00-85 | NEETS, Module 20, Master Glossary and Index                         |  | 4 |
|  | NAVEDTRA B72-21-00-87 | NEETS, Module 21, Test Methods and Practices                        |  | 4 |
|  | NAVEDTRA 12160        | Interior Communications Electrician, Volume 1                       |  | 4 |
|  | NAVEDTRA 12164        | Electrician's Mate  |  | 4 |
|  | OPNAVINST 4790.4      | Ship's Maintenance Material Management (3-M) Manual                 |  | 2 |
|  | OPNAVINST 5100.19     | Occupational Safety and Health (NAVOSH)                             |  | 2 |
|  | EUG                   | EOSS User's Guide   |  | 3 |
|  | S9514-DF-MMO-010      | Vent Fog Precipitator   |  | 1 |
|  | NSN-0411-LP-502-0070  | Operational Reports   |  | 5 |
|  | NSTM, Chapter 079     | Engineering Casualty Control  |  | 1 |
|  | NSTM, Chapter 221     | Boilers   |  |   |
|  | NSTM, Chapter 300     | Electric Plant – General  |  | 1 |
|  | NSTM, Chapter 302     | Electric Motors and Controllers                                     |  | 1 |
|  | NSTM, Chapter 310     | Electric Power Generators and Conversion Equipment                  |  | 1 |
|  | NSTM, Chapter 313     | Portable Storage and Dry Batteries                                  |  | 1 |

|            |   |   |                 |   |
|------------|---|---|-----------------|---|
|            | NSTM, Chapter 320                                       | Electric Power Distribution Systems   |                 | 1 |
|            | NSTM, Chapter 330                                       | Lighting  |                 | 1 |
|            | NSTM, Chapter 422                                       | Navigation and Signal Lights  |                 | 1 |
|            | NSTM, Chapter 430, Interior Communications Installation | Interior Communication Installations  |                 | 1 |
|            | NSTM, Chapter 475                                       | Magnetic Silencing  |                 | 1 |
|            | NSTM, Chapter 491                                       | Electrical Measuring and Test Equipment   |                 | 1 |
|            | NSTM, Chapter 504                                       | Pressure, Temperature, and Other Mechanical and Electromechanical Measuring Instruments |                 | 1 |
|            | NSTM, Chapter 510                                       | Heating, Ventilating, and Air Conditioning Systems for Surface Ships                    |                 | 1 |
|            | NSTM, Chapter 512                                       | Fans  |                 | 1 |
|            | NSTM, Chapter 516                                       | Refrigeration Systems   |                 | 1 |
|            | NSTM, Chapter 531                                       | Desalination Plants   |                 | 1 |
|            | NSTM, Chapter 551                                       | Compressed Air Plants and Systems   |                 | 1 |
|            | NSTM, Chapter 555                                       | Surface Ship Firefighting   | Volumes 1 and 3 | 1 |
|            | NSTM, Chapter 562                                       | Surface Ship Steering System  |                 | 1 |
|            | NSTM, Chapter 581                                       | Anchoring   |                 | 1 |
|            | NSTM, Chapter 583                                       | Boats and Small Craft   |                 | 1 |
|            | NSTM, Chapter 589                                       | Cranes  |                 | 1 |
|            | NSTM, Chapter 593                                       | Pollution Control   |                 | 1 |
|            | NSTM, Chapter 633                                       | Cathodic Protection   |                 | 1 |
|            | NSTM, Chapter 722                                       | Cargo and Weapons Elevators   |                 | 1 |
| <b>EM2</b> | NSTM, Chapter 531                                       | Desalination Plants, Volumes 1, 2, and 3  |                 | 1 |
|            |   |   |                 |   |
| <b>EM1</b> |   | No additional   |                 |   |

|   |  |   |  |  |
|---|--|---|--|--|
|   |  | references; all references are listed above               |  |  |
| <b>EMC</b>  |  | No additional references; all references are listed above |  |  |
| <p><b>LEGEND:</b></p> <p>Note 1 – To order, MILSTRIP to Naval Inventory Control Point (NAVICP), Philadelphia, PA or via INTERNET <a href="http://www.nll.navsup.navy.mil">http://www.nll.navsup.navy.mil</a></p> <p>Note 2 – Available via INTERNET <a href="http://www.nll.navsup.navy.mil">http://www.nll.navsup.navy.mil</a> or <a href="http://neds.nebt.daps.mil">http://neds.nebt.daps.mil</a></p> <p>Note 3 – To order the EUG, Commander, Naval Surface Warfare Center, Caderock Division, Code 943, Philadelphia, PA 19112-5083.</p> <p>Note 4 – Catalog of Nonresident Training Courses, NAVEDTRA 12061</p> <p>Note 5 – To order, MILSTRIP to Naval Inventory Control Point (NAVICP), Philadelphia, PA or via INTERNET <a href="http://www.nll.navsup.navy.mil">http://www.nll.navsup.navy.mil</a> or via Navy Tactical Information Compendium (NTIC) Series B1, CD-ROMs (see your command Naval Warfare Publication (NWP) Custodian.</p> |  |   |  |  |